# COSMETICS

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## A HANDBOOK

OF THE MANUFACTURE, EMPLOYMENT, AND
TESTING OF ALL COSMETIC MATERIALS AND
COSMETIC SPECIALTIES

BY

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# PREFACE

THE cosmetic industry is mainly indebted to the researches of chemists, who have first pointed out the right paths to follow, and then introduced new and valuable substances to employ in the preservation of the hair and teeth, and also obviated certain injurious influences by the aid of antiseptics. Furthermore, dangerous substances have been replaced by innocuous substitutes; and, in a word, the technology of cosmetics has been undoubtedly elevated to the position of a branch of natural science.

The manufacture of cosmetics is still, in many instances, suffering from too close an adherence to ancient tradition, whereby entirely useless substances are accredited with healing powers; and even—which is far more serious—directly poisonous and injurious materials are employed, the use of which might entail great danger to health.

In many quarters too little importance is still attached to the consideration of the first question that should arise in connection with any cosmetic, namely, whether the same contains any ingredients capable of acting beneficially in the cases for which it is designed, and without leading to injurious results on prolonged employment.

Now, it is only when this primary question has been put, and satisfactorily answered, that the rational stage of cosmetic technology is reached; and to answer this question it is necessary to have an accurate knowledge of the materials under consideration. This forms the basis of the present work, which is an endeavour to afford guidance and advice to the maker of cosmetic preparations; and to point out the best as well as the simplest methods of procedure. The fundamental principles to be followed in making up the various preparations are fully explained. Where the habits and whims of the public demand remedies where none exist, the question of how to satisfy this demand has received consideration, without, however, omitting to call attention to the inadequacy of the preparations themselves. All injurious ingredients have been strongly banned.

It is highly desirable that the mystery of "secret preparations" should be abandoned in cosmetics, and all endeavours concentrated on the attainment of perfection.

Such a course would soon gain the confidence of the public, and would be of the greatest advantage to the cosmetic industry itself, which would then take up a position beside the sister industry of perfumery; and, within its proper limits, be just as useful as other branches of technology.

That the present work may incite and conduce to the establishment of cosmetic technology on a rational basis, and may prove useful to all engaged in this really profitable branch, is the sincere wish of

THE AUTHOR.

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# CHAPTER X.

## COSMETIC SECRET PREPARATIONS FOR THE SKIN, COMPLEXION, TEETH, MOUTH, ETC.

IN many cases, cosmetic secret preparations are the cause why cosmetics do not enjoy the reputation that is really their due. Some of these preparations have been compounded in ignorance of the properties and action of the ingredients used; not infrequently these ingredients are directly contradictory among themselves; and oftentimes—which is the most to be deplored—they are directly injurious.

This is the domain of the empiric and ignorant manufacturer, since on the one hand, hardly any of his customers is in a position to test the efficacy and harmlessness of the article; and, on the other, human vanity is exceedingly great with regard to the concealment of bodily defects. And the more that certain defects are declared incurable by serious science, the more the experienced cosmetic practitioner emphasises that the production of hair is an impossibility, that wrinkles are inevitable attendants on age, and that cuticular impurities are removed with greater certainty and less danger by a suitable mode of life; so much the more does ignorance turn towards quackery, and not infrequently such " patients " are put through treatments which any medical man would fear to apply, and which the patients themselves would not stand from any regular scientific practitioner.

An acquaintance with these secret preparations is necessary to the cosmetic manufacturer; in the first place, because he must be informed on every point connected with his sphere of labour; and, secondly, because he is in a position to eliminate the bad, replace it by good, and thus convert many worthless preparations into articles of utility.

### SECRET PREPARATIONS FOR THE HAIR

Fixoline.—A balsamic hair restorer, compounded of wax, lard, Peruvian balsam, alcohol, and inert aromatic substances. Is without effect.

Seebald's Hair Tincture consists of—Resorcin, 4·0; burnt sugar, 0·6; lemon oil, 2·5; Peruvian balsam, 1·5; 80 per cent. spirit, 92·0 parts. Is ineffectual.

Javol.—This is a wash for the head and hair, compounded by W. Anhalt of Colberg, and consisting of—Beef tallow, 1 gram; lemon oil, 5 grams; tincture of quinine, 15-20 grams; potassium carbonate, 0·2 gram, and sufficient water to make up 100 grams. According to this formula, the preparation contains about 1·2 per cent. of a soap prepared with potash instead of soda.

Eau Sublime de Feuilles.—A hair dye made by Chrynet of Paris, is guaranteed innocuous by the maker; but, being a 1½ per cent. aqueous solution of lead acetate with glycerin and sulphur, cannot be so considered. It is sold at the rate of 5 francs (4s.) per bottle (200 grams).

Seegar's Blonde Hair Dye consists, according to Hofmaas, of a solution of 1 per cent. pyrogallol and 1 per cent. cupric chloride. The brown and black dyes also contain the same ingredients in a more concentrated form. The preparation may be injurious to health.

Jonke's Colour Restorative for the Hair consists of an ammoniacal solution of silver nitrate, with an addition of alcohol and glycerin. It is neither better nor worse than many others of the same kind.

Esillag's Beard-forcing Pomade is an ordinary fat pomade, with traces of bergamot oil, Peruvian balsam, and similar adjuncts.

Esilling's Tea Hair Wash consists of camomile flowers, and is of no importance.

Jonke's "Non plus ultra" Hair Dye is on the one hand a scented solution of pyrogallic acid, and on the other an ammoniacal solution of silver nitrate. No better or worse than numerous others.

Eau de Quinine Pinaud contains, according to Tscheppe, no trace of quinine or any other chinchona base or characteristic constituent of this bark. Metallic salts, tannin, salicylic acid, and cantharides are also entirely lacking.

Eau de Zenoble, a hair dye, chiefly consists of a solution of sodium hyposulphite, sulphate, and acetate, with free acetic acid, and a sedimental deposit of lead sulphide. It is probably prepared by precipitating a solution of lead acetate with dilute sulphuric acid, and dissolving the precipitate in sodium hyposulphite. The lead sulphide found results from spontaneous decomposition.

Krell's Beard Tincture (Fr. Netter) consists of linseed oil, castor oil, charcoal, saltpetre, a little sulphur, and pounded bread crust, coloured either light or dark.

Vienna Cosmetic, Seegar's Hair Water, contains large proportions of iron, copper, pyrogallic acid, and free hydrochloric acid. May be dangerous to health.

Heiderich's Hair Fluid connins large quantities of lead acetate, and may be very dangerous to health.

Plumbiferous Hair Waters. The following plumbiferous preparations are sold in the Netherlands:—Allen's Hair Restorer, Ayro's Hair Invigorator, Eau de Castile, Eau d'Inns, Eau de Florida, Eau Magique, Eau Hamilton, Eau d'Amerique, Melrose's New Hair Wash, New London Hair Restorer, Rosetter's Hair Restorer, Royal Windsor Hair Restorer. All of them are open to objections based on their constitution.

Hair Regenerator, a preparation sold in Austria, contains metallic ingredients.

Schneeweiss's Rapid Hair Dye contains copper, and may therefore be injurious.

Trixogene Hair Restorer is an alkaline liquid, containing small quantities of alcohol, ammonia, boric acid, salicylic acid, and glycerin, the great bulk, however, being merely water.

Aphrodite Hair Dye is an acid alcoholic liquid containing free hydrochloric acid, cupric chloride, ferric chloride, and pyrogallic acid. May be injurious to health.

Phœnix Hair Dye.—A case of poisoning following the use of this dye for a short time has been confirmed by Pollak; the symptoms, eczema and œdema, disappeared as soon as the preparation was discontinued. The toxic properties of the dye are attributable to paraphenylenediamine, which is a powerful blood poison, converting hæmoglobin into acid hæmatin.

Eckert's Hair Wash consists of water, alcohol, glycerin, lead acetate, fruity ether, and a sediment of undissolved lead acetate and precipitated sulphur. May be directly injurious to health.

Moustache Balsam, for promoting the growth of the beard, consists of fat, wax, and scent.

Scurf Essence (Lautenschlaeger, of Bischofsheim).—A scented ammonia soap, with alcohol and glycerin.

Oriental Depilatory consists of a mixture of liver of sulphur, calcium sulphide, calcium carbonate, and charcoal. There are many other better, cheaper, and more reliable means for attaining the same end.

Capillarine Hair Restorer (A. Altenkirck, Berlin) consists of absolute alcohol, onion juice, French brandy, Peruvian balsam, burdock-root oil, and juniper-berry oil, with an addition of fat or tallow.

Kneifel's Hair-forcing Tincture consists of ethereal oils, with extractive substances from onions and chinchona bark.

Ristoratere dei Capelli (Rizzi Frati, Florence) contains lead, and may therefore be injurious.

Braun and Jacoby's Eau Capillaire, advertised as an antiseptic cosmetic for promoting the growth of the hair, consists of—Quinine, 0·14 per cent.; glycerin, 5 per cent.; alcohol, 68·9 per cent.; water, 25 per cent.; Peruvian balsam, 2 per cent.; and inert scented substances, with traces of lead. It does not fulfil its purpose in any respect, and, indeed, may be injurious.

New Balsamic Hair Dye.—This balsam contains 3·652 per cent. of lead acetate in addition to precipitated sulphur, scent, and small quantities of glycerin. May be injurious.

Erasmus Wilson's Hair Promoter consists of 300 parts of almond oil, 300 of ammonia, 500 of rosemary spirit, 60 of cantharides tincture, and 35 of lemon oil.

Io, a hair dye sold in Vienna, consists of paraphenylenediamine, and, like the similarly composed preparation "Phœnix," may be dangerous to health.

Origo, a hair dye prepared by W. Jorgensen of Copenhagen, is free from lead, but consists of an ammoniacal solution of bismuth, containing a large amount of sulphur in suspension, a little glycerin, and strongly scented with rose oil. It is not uninjurious.

Kohol, advertised as a hair dye, contains Indian ink suspended in a solution of gum-arabic in thin quince mucilage. It is entirely harmless, but not permanent.

Aureol consists of 1 per cent. of methol, 0·3 per cent. of amidophenol hydrochlorate, and 0·6 per cent. of monoamidophenylamine, the whole dissolved in 50 per cent. spirit containing 0·5 per cent. of sodium hyposulphite. The hair must, of course, be first cleansed of fat by soap or soda. The aureol is then mixed with an equal amount of hydrogen peroxide and applied to the hair with a fine comb. After two to three hours a dark brown colour is developed, which can be deepened by repeating the operation.

Glycoblastol (A. Sarg's Sohn & Co., Liesing, near

Vienna) is a scented liquid, containing 35·22 per cent. by weight of alcohol, 61·64 per cent, of glycerin, and 0·19 per cent. of a substance—probably capsicin—allied to cardol.

Seebald's Tincture for preventing Scurf and the Falling out of the Hair consists of an extract of fresh orange peel in dilute alcohol, with 5 per cent. of resorcin and 3 per cent. of Peruvian balsam. This preparation has been found, in many instances, to produce reddening of the skin and pustules, and may therefore be injurious.

Pinaud's Eau de Quinine has the composition—Crameria tincture, 2; cantharides tincture, 1; alcohol, 50; lavender spirit, 5; glycerin, 7½; and quinine sulphate, 1.

Sterling's Ambrosia is a North American hair dye, containing about 1 per cent. of lead acetate. May be injurious.

Hegewald's Antiphilathron, for preventing the falling out of the hair, is a filtered extract of 2·5 gall nuts with a mixture of 50 of strong spirit and 30 of water, scented with several ethereal oils.

Bittner's Aricine Pomade, for maintaining and invigorating the growth of the hair, is an ordinary pomade, and does not contain any aricine at all. It is sold at a price equal to 1s. per oz.

Fragelli's Beard Producer consists of a spirituous extract of lavender, benzoin, cinnamon, and santal-wood oil.

Royer's Beard-producing Pomade is an ointment compounded of 1 part of red chinchona powder and 1½ parts of wax hair pomade. It is sold at a price equal to 1s. 6d. per oz.

Bergmann's Beard-producing Tincture is an alcoholic extract of tree bark, scented with a little oil of rosemary and thyme.

Royer's Beard-producing Tincture consists of 10 parts of common salt, 180 parts of imitation French brandy (containing fusel oil), and 2 of mace tincture. It is innocuous.

Elsner's Beard Dye consists of two liquids; the one contains pyrogallic acid, and the other is an ammoniacal solution of silver nitrate.

Netter's Beard Tincture consists of linseed oil, castor oil, charcoal, saltpetre, with a little sulphur and pounded bread crust. Over 4s. per bottle is the price charged for this "eminently rational" preparation.

Onion Solution for the Beard, which is claimed to be prepared from the juice of the onion, and to raise a strong, full beard on the chins of youths in their fifteenth year, consists of dilute scented spirit coloured with gentian tincture. The price is equal to 4s. 3d. per bottle.

Baume Circassienne, a Viennese hair dye, is a solution of lead acetate in aromatic water, with a small addition of sulphur. May be injurious.

Wortley's Berenizon, a stimulant for the hair, consists of Peruvian balsam, 3 parts; castor oil, 3; cantharides, 4; alcohol, 85; and rose water, 40 parts.

Spring of Life, a Hamburg hair dye, contains lead acetate, and may be injurious.

Brilliantine, for beautifying the beard, is composed of castor oil, 7; almond oil, 50; glycerin, 22; Jockey Club extract, 2½; and spirit, 125 parts. Any fat would do just as well.

Pinaud's Brilliantine is a scented liquid which separates into two layers, and consists of about ¾ of olive oil and ¼ alcohol.

Wallritz's Cactus Pomade, for promoting the growth of the hair, is prepared by crushing 125 parts of cactus (spines and all) in a mortar, and boiling the same in a vessel, which must not be of copper, an addition of turmeric and indigo being made until a green colour is produced. The strained liquid is stirred until cold, with 750 parts of water, 60 of glycerin, 15 of tannin, 7½ of rosemary oil, and 4 parts of fennel oil.

Lohse's Chromacome Hair Dye consists of two liquids, the one being a tincture of gall nuts, and the other a solution of iron acetate with a little silver nitrate.

Comachrome, for dyeing the hair black, is a solution of silver nitrate with pyrogallic acid.

Buchligen's Hair Preservative is a mixture of arnica tincture, 10 parts; glycerin, 5; water, 60; and alcohol, 10 parts.

Henry's Cosmetic for preventing the hair falling out or turning grey, consists of 180 parts of spirit, 3 of lemon oil, 1 part each of bergamot oil, rosemary oil, and lavender oil. The price charged for this "wonderful" but altogether inefficacious preparation is at the rate of 3s. for 4 oz., an extra charge of 9½d. being levied for the "rational" directions for use.

Funke's Crinine is an ammoniacal solution of silver nitrate.

Eau d'Afrique, for dyeing the hair black, consists of three liquids to be applied in succession: (1) A solution of 3 parts of silver nitrate in 100 of water; (2) an 8 per cent. aqueous solution of sodium sulphide; (3) a solution of silver nitrate, like the No. 1, but scented.

Eau d'Apollon is a scented aqueous solution of lead acetate, which is harmless.

Eau de Bahama, for dyeing the hair black, is a solution of lead acetate, containing sulphur in suspension, and scented with aniseed oil. This preparation may be injurious.

Kamprath & Schwartz's Eau de Capille hair dye is a mixture of 16 parts glycerin, 8 of sodium hyposulphite, 1 of lead acetate, 2 of precipitated sulphur, and 130 of water, scented with a small quantity of eau de Cologne. Containing lead, it may be injurious.

Bergmann's Ice Pomade, for curling the hair, is ordinary pomade.

Auricomus Golden Hair Wash is an aqueous solution of hydrogen peroxide.

Kreller's Milanese Hair Balsam consists of—Beef marrow, 40 parts; chinchona extract, 5 parts; 1 part each of Peruvian balsam, styrax, and bergamot oil, and ½ part of lemon oil.

Migaree's Moustache Balsam is composed of fat and resin.

Pinkas' Invigorating Hair Oil is a solution of Peruvian balsam and extract of walnut shells, with a little cinnamon tincture, in strong spirit.

Karig's Crinochrome consists of a solution of 10 parts pyrogallic acid in a mixture of rectified wood vinegar and spirit of wine, 500 parts of each; and a solution of silver nitrate, 30 parts; in 900 parts of distilled water, with sufficient ammonia to redissolve the precipitate first formed.

Nieske's Patent Birch-oil Balsam, advertised as an innocuous preparation, and as a solution of the pith of South American birch, really consists of an aqueous solution of lead acetate and a 10 per cent. precipitate of a mixture of lead carbonate and sulphur. It is therefore far from being innocuous.

Franz's Puritas Rejuvenator for Grey Hair consists of—Glycerin, 40 parts; water, 106; soda crystals, 3; cadmium sulphide, 15; and zinc sulphide, 1-3 parts.

Rostel's Recriation, for stimulating the growth of the hair, is a solution (10 per cent.) of glycerin and potash in water.

Polt's Reseda Curling Pomade is a simple pomade of yellow wax, cocoanut oil, olive oil, with an agreeable scent of mignonette and orange flowers.

Grolich's Roborantium, to remedy baldness, is dilute eau de Cologne with a little glycerin. The preparation has the highly valuable property of being absolutely innocuous. Pinkas' preparation, sold under the same name, for promoting the growth of the hair and beard, is a weak alcohol, with additions of sulphuric ether, acetic ether, liquidambar, rose water, and traces of clove oil and glycerin.

Milk of Roses Extract, a Viennese preparation for dyeing the hair, contains 10 parts of lead acetate, 15 of glycerin, 5 of sulphur, and 70 parts of an aqueous liquid scented with rose oil.

Lautenschlaeger's Scurf Essence is a scented ammonia soap, dissolved in alcohol and glycerin.

Liquid Shampoo contains 2 parts each of Quillaya fluid extract and eau de Cologne, 1 of glycerin, 4 of alcohol, and 7 of rose water.

American Shampoo Liquid contains—Rum, 1000 parts; spirit of wine, 120; cantharides tincture, 3; ammonium carbonate, 5; and potash, 10 parts.

Shampoo Powder is a scented mixture of 22·5 borax, 30 calcined soda, and 15 Quillaya.

Tincture de Leytens, a so-called vegetable hair dye, consists of two liquids, one of which (*a*) is a solution of silver nitrate coloured with aniline blue, the other (*b*) a dilute solution of calcium pentasulphide.

Brugier's Tolma ("The Newest and Best Hair Preservative") is a rose-coloured liquid, consisting of 1 part ordinary glycerin, 10 parts of water, and a little sulphur in suspension.

Allen's World's Hair Restorer, for Renewing, Strengthening, Beautifying, and Cleansing the Hair; consists of—Sulphur, 5·6; lead acetate, 8·0; glycerin, 100; and aromatic water, 200 parts. Another preparation consists of—Precipitated sulphur, 17 parts; cinnamon, 2; glycerin, 200; lead acetate, 26·5; and water, 630 parts.

Agnes Teumel's Depilatory for ladies chiefly consists of melted pine resin.

Mulder's Hair Balsam is an aqueous solution of rose leaves, with about 5 per cent. of carbolic acid.

Kogler's Hair-renewing Pomade consists of cocoanut fat, containing, in addition to scent, a little of a sulphur oil, presumably oil of mustard.

Seebold's Hair Tincture contains in 100 parts, 40 of resorcin, 0·6 of caramel, 2·5 of lemon oil, 1·5 of Peruvian balsam, and 92 of spirit.

SECRET PREPARATIONS FOR THE SKIN AND COMPLEXION

Poudre Antiasthmatique Clery consists of a mixture of powdered sage leaves, belladonna-leaf powder, and saltpetre. The belladonna is said to be efficacious, but the powder cannot fulfil its purpose.

Lewinsohn's Freckle Cream consists of 10·8 per cent. of "white precipitate," basic bismuth nitrate, lanolin, and ethereal oils. It cannot do what is claimed for it, and may be dangerous.

Lana Cream is a preparation bearing the trade-mark of the Norddeutsche Wollkaemmerei of Bremen, and, according to Lohmann, is a yellowish white ointment prepared by the aid of wool fat. The water incorporated with the wool fat contains free hydrochloric, sulphuric, and nitric acids, the latter especially in large proportion, and must therefore produce an injurious effect on the skin.

Grolich's Face Ointment (C. J. Dahms) is a white precipitate ointment mixed with bismuth white and scented with rose oil. May be injurious to health.

Legran's Freckle Ointment consists of a fat scented with rose water, and containing bismuth nitrate.

Spitzer's Face Pomade is a mixture of fats, scented with rose water, and containing white precipitate. Probably injurious to health.

Milk of Lilies, a wash for the skin, contains rose water, glycerin, and magnesium silicate.

Poudre de Riz de Java (Bourgeois, Paris) contains 25·5 per cent. of zinc oxide and 74·5 per cent. of talc, but no trace of rice. The price charged is equivalent to 8s. 3d. per 3-oz. tin, whereas the real value is not more than sixpence. Moreover, the mixture may be injurious.

Crême Iris consists of 0·5 per cent. borax, 2 per cent. powdered talc, 10 per cent. zinc oxide, 87·5 per cent.

glycerin ointment, scented with tuberose extract. Is objectionable on account of the zinc oxide present.

Eau de Lys de Lohse has the following composition:—Powdered talc, 4 per cent.; zinc oxide, 8 per cent.; glycerin, 6 per cent.; rose water, 82 per cent. Is objectionable by reason of the zinc oxide.

Gross & Reichardt's Betulinar is a scented liquid consisting of 11 parts of a solution of menthol-betulin, 19 parts boroglycerin, 20 parts birch tincture, and 50 parts aromatic birch water.

Crême Lefebvre, a remedy for freckles, is a yellow ointment composed of fat and wax, with a little sublimate. May be poisonous.

Eau de Circassiennes du Thompson, a remedy for freckles, consists of 30 parts zinc oxide triturated with 200 parts of scented water.

Vienna Face Water is composed of about 12-13 parts of commercial (plumbiferous) zinc oxide, 1½-2 parts of bismuth oxychloride, and 86-87 parts water, with a few drops of glycerin, rose water, and carbolic acid. It may be injurious.

Ayer's Recamier Cream is a mixture of zinc oxide with glycerin, scented with rose oil spirit, and contains a little mercuric chloride.

Rejuvenating Pills, said to be of Parisian origin, contain strychnine, and have been denounced by M. and A. Jolles of Vienna.

Spitzer's Freckle Ointment contains mercuric and mercurous salts.

Albadermine, a remedy for freckles, consists of 2 solutions: (*a*) contains 7·5 potassium iodide and 0·35 iodine dissolved in 12·5 glycerin and 120 of extract of rose leaves; (*b*) is a solution of 75 sodium hyposulphate in 500 rose water.

Albion, a Parisian specific for wrinkles, and to whiten the skin, is lead chloride and mercuric chloride in an aromatic water.

Fagner's Amandine is a cosmetic soap crême. Sixty parts of powdered gum and 90 of powdered Venetian soap are mixed with 180 of honey and 1000 parts of almond oil, 5 egg yolks and 125 parts of milk of almonds are added by degrees. The whole is coloured with carmine and scented with oil of bitter almonds.

Praeger's Axeromaticum, a remedy for sweaty hands, is ordinary water coloured rose-red with carmine and scented with a little lemon oil. This "precious" remedy is sold at the rate of 1s. 6d. per 2 oz.

Baby Powder consists of 25 parts boric acid, 500 of wheaten flour, 440 of Venetian talc, and 10 of geranium oil.

Balsamisk Amikos, for the toilet, is a scented solution of borax.

Lengiel's Birch Balsam, a beautifier and specific against wrinkles, pockmarks, freckles, etc., consists of 5 parts sodium silicate (waterglass), 2 of potash, 1 of soap, 5 of gum arabic, and 10 of glycerin, in 400 parts of water; but no trace of birch sap. Any soap will work the same miracle without costing 4s. per bottle, like this preparation.

Bismuth Powder, for beautifying the skin, contains no bismuth, but consists of chalk and clay.

Blanc Camélia, a white cosmetic for the face, consists of 5 parts magnesium carbonate, 10 parts each of bismuth subchloride and precipitated chalk, and 75 parts of the whitest asbestos, with 0·5 per cent. of ultramarine.

Blanc de Perles, a beautifying wash, consists of scented water containing a little alcohol, and showing a dense white sediment of calomel and lead carbonate.

Pollan's Cosmetic Caustic, for warts, birthmarks, etc., is a mixture of equal parts of fused caustic potash and medicinal soap, with 8 parts of slaked lime.

Molfenter's Chemical Preparation for warts, is fuming hydrochloric acid.

Parisian Complexion Balsam, for rough and cracked skin, consists of equal parts of glycerin and egg albumin, faintly perfumed. Of course, glycerin would be just as efficacious by itself.

Irvine's Compound Chinese Tablet of Alabaster, a skin beautifier, consists simply and solely of calcium carbonate.

Simmerling's Cosmeticum, for skin diseases, freckles, etc. Sweet almonds, 30 parts, and bitter almonds, 15, are pounded to an emulsion with 330 of water, then strained and mixed with 25 parts of benzoin tincture and 15 of lemon juice.

Cosmetic Vinegar is a mixture of 60 parts benzoin tincture, 10 parts Peruvian balsam, 150 each of eau de Cologne and Hofmann's balsam, and 300 parts of acetic acid, clarified by settling and filtration.

Rowland's Kalydor Cosmetic Wash, an American beautifier, is an emulsion of 30 parts of blanched bitter almonds and 500 parts of rose water, containing in solution 0·5 of mercuric chloride.

Rottmanner's Cosmetic Paste consists of a white wax ointment with a little sulphur, bismuth oxide, and zinc oxide.

Crême de Beauté, a beautifier, is an emulsion of sweet and bitter almonds; of course, without any action at all

Crême du Liban Cosmetic is a mixture of olive oil, 35 parts, 5 parts each of wax and spermaceti, 5 of blanched sweet almonds, 20 of bismuth subnitrate, 30 of talc, 2 of benzoin tincture, 10 drops of Peruvian balsam, 5 drops each of rose oil and orange-flower oil, with sufficient olive oil to form a tough pulpy mass. Useless as a cosmetic.

Crême Simon à la Glycérine, a remedy for redness of the skin, blackheads, etc., consists of a mixture of zinc white, glycerin, and talc, scented with a little patchouli oil.

Pohlmann's Face Powder.—White lead, 14; talc, 7; magnesia, 1; coloured with a little carmine, and scented with volatile oils.

Querloin's Eau Cosmetique is a mixture of bitter almond water, 30; rose water, 600; lead acetate, 1; spirit, 50; and benzoin tincture, 1.

Kreller's Eau d'Attirona, a beautifying soap, is an alcoholic extract of cloves and cinnamon, with 4 parts of soda soap and a few drops of peppermint oil.

Stenard's Eau de Beauté consists of 122 parts orange-flower water, 0·45 mercuric chloride, and 2·5 calomel.

Eau de Blanc de Perles contains 15 per cent. of white lead.

Eau de Castille, for freckles, contains sodium hyposulphite and lead acetate.

Eau de Naples, a beautifier, consists of—Borax, 12 parts; distilled water, 100; rose water, 50; camphor, 1; and benzoin tincture, 4 parts. Harmless.

Renard's Eau des Princesses consists of—Calomel, 2·5; corrosive sublimate, 0·45; orange-flower water, 122 parts.

Viola's Ephelidène, a beautifying wash and wrinkle smoother, is a slightly alkaline, weak alcoholic extract of styrax. Harmless.

Esprit d'Amaranth, for freckles, contains in bottle No. 3, which must be applied first—One part of corrosive sublimate and 30 of spirit (containing fusel oil); in bottle No. 2, over 2 parts of sublimate; and 3 parts of the same chemical in bottle No. 1.

Extrait de Camélias, a cosmetic largely sold in Paris, consists of white precipitate powder finely distributed in water.

Honora, an American beautifier, is a solution of 4·807 grams of potash in 50 c.c. of an extract of soap and violet root, with a little musk tincture.

Kaloderma, for rendering the skin soft and delicate, is composed of potash soap, glycerin, camphor, and comminuted almonds. The same effect could be more cheaply produced with glycerin by itself.

Rowland's Kalydor, a toilet preparation, is com pounded as follows:—100 parts of bitter almonds are made into an emulsion with 500 parts of rose water, the product being strained and mixed with 7·5 of sal-ammoniac and 15 of cherry-laurel water, followed by a solution of 0·10 sublimate in 15 of alcohol.

Candes & Co.'s Lait Antéphélique, a wash for freckles and other defects of the skin, contains 10 parts of corrosive sublimate, 1 of sal-ammoniac, 140 of egg albumin, 7 of lead sulphate, 2 of camphor, 840 of water.

Lait de Hébé, for freckles, is prepared in the following manner:—250 parts of Marseilles soap are dissolved in 500 of water containing a little potash, and the solution is treated with a solution of magnesium sulphate until the precipitation of soap ceases. The precipitate is collected, drained, and stirred up with 900 parts of 33 per cent. alcohol, 15 parts each of benzoic acids, sternanis oil, and lemon oil, 5 parts each of caraway oil, verbena oil, and oil of thyme, and 10 parts of Tolu balsam tincture being afterwards added. The preparation cannot produce the effect claimed.

Lilionese, a beautifier, consists of a saturated solution of potash, scented with a few drops of cinnamon oil and rose oil.

Gschleiden's Milk of Lilies is a mixture of rose water, glycerin, and magnesium silicate.

Schubert's Milk of Lilies is a solution of 3 per cent. of borax, 2 per cent. of benzoin tincture, and 95 per cent. of water.

Nieske's Menyl, a specific for redness of the nose, consists of—No. 1, a spirituous, slightly perfumed solution of benzoic acid, salicylic acid, and thymol; No. 2, of zinc white, talc powder, and a trace of phenol. Another preparation of the same name consists of an aqueous extract of violet root, with a not inappreciable deposit of calomel. The first of these articles is entirely inefficacious, the other may be injurious.

Vogel's Odalin, a beautifying wash for freckles, moles, brittle skin, etc., is a solution of borax in glycerin water scented with rose oil, and coloured red with fuchsine.

Oleagine, a skin purifier, is an ordinary soap made of lard and soda, with starch and scented oils. Harmless.

Rother's Pasta Cosmetica, for pimples on the face, is an ointment of sulphur, styrax, and fat.

Pasta Mack, a toilet preparation, consists of 27 per cent. of rice meal and 73 per cent. of effervescing powder.

Rix's Pasta Pompadour, for freckles and moles, is a mixture of finely ground blanched almonds (bitter) and cold cream or wax pomade.

Lehmann's Pomade is a cosmetic compounded of almond oil, 20; white wax, 10; spermaceti, 5; bismuth sub-nitrate, 1; white precipitate, 1; glycerin, 3 parts, and a little scent.

Mueller's Poudre d'Adonis is claimed to impart to the face the delicacy of that of a girl of sixteen. It consists of 60 parts of prepared talc powder, coloured with a little madder lake, and slightly scented.

Bichler's Pilachrine, a specific for red noses, consists of water with about 10 per cent. alcohol, and containing coarse sand and sulphur in suspension.

Cobbe's Rosalind, a New York cosmetic for tinting the face, fingers, and lips, consists of 10 parts of eosine, 30 each of white wax and spermaceti, and 410 of petroleum jelly.

Rosy Cheeks without Rouge consists of powdered siliceous sponge. Under the microscope the preparation exhibits numerous siliceous needles, which penetrate the skin, producing mechanical irritation, and thus reddening the face.

Rouge de Théâtre, an American preparation for beautifying the skin, consists of talc, chalk, starch, and a little carmine to produce a red colour.

Sarah Bernhardt Powder La Diaphane consists of 50 grams each of powdered steatite and rice meal, and 28 of zinc white. The scent for the white powder is—Berga mot oil, 3; ylang-ylang oil, 2; neroli oil, 2; eau de Cologne, 20 grams: for red—Bergamot oil, 3; rose oil, 2; white rose extract, 2 grams; 10 drops each of Ceylon cinnamon oil and musk tincture, coloured with carmine: for yellow—Bergamot oil, 3; clove oil, 1; cedarwood oil, 1; and patchouli oil, 1; extract of new mown hay, 20 grams, the colouring matter being equal parts of light and dark cadmium yellow: for black—Portugal oil, 4; lavender oil, 1; petit grain oil, 1; Ess Bouquet extract, 15 grams; musk tincture, 20 drops; the colouring matter consisting of moist prepared vine black.

Viennese Face Wash consists of 12-13 parts of commercial zinc oxide, 1½-2 of bismuth oxychloride, and 86-87 of water, with a few drops of glycerin, rose oil, and a trace of carbolic acid.

Seiffert's Schneewittchen, a beautifier, is an aqueous solution of borax and glycerin, scented with rosewood or similar rose-perfumed oils.

Mizerski's May Dew Beautifier is prepared in the following manner:—100 parts of alum are dissolved in water and precipitated by a solution of 100 parts of soda crystals, the precipitate being washed with water and dissolved in 50 parts of concentrated vinegar, then mixed with 60-80 parts of damp, freshly levigated clay, followed by 30 of glycerin and sufficient water to make the whole up to 400 parts. A little eau de Cologne is added for its perfume.

Mueller's Oriental Milk of Beauty, a "world-famed" beautifier, for defects of the skin, consists of—Prepared talc, 12·5; glycerin, 10; borax, 0·5; eau de Cologne, 12 parts, with a little musk and 100 parts of water.

Kohlmann's Milk of Beauty.—Sweet almond oil, glycerin, and gum arabic, 7·6 of each, are emulsified with enough strawberry water to make 400 parts, 4 parts of Calidor essence and 15 of benzoin tincture being then added. The Calidor essence is composed of—Mace oil, 2;

**patchouli extract and jasmine extract, 12 each; Peruvian balsam and benzoin, 2 each; and Tolu balsam, 1 part.**

Hudson's Beauty of Venus Paste is a very soft white ointment, consisting of 18 per cent. white wax, 4 per cent. stearin, 50⅔ per cent. castor oil, 18 per cent. glycerin, 1⅓ per cent. precipitated sulphur, 5 per cent. moisture, and 3 per cent. perfumed oils, chiefly lemon oil and bergamot oil.

Lewicki's "Dew of Beauty" Water (maker's recipe).—Dew is collected on the grass in summer, distilled, and treated to an addition of 15 grams of pimpernels and 30 of powdered alum per ¼ litre of distillate, the whole being then boiled gently for an hour and strained through a close cloth. Four grams of calcined magnesia are partially dissolved in 50 of rectified spirit and 100 of the strongest wine vinegar, in such a manner that the undissolved portion of the magnesia forms with the vinegar a white mixture, which may be scented. This is mixed with the first liquid.

Rottmanner's Beauty Water, an "only reliable remedy for facial eruptions," consists of a 1 part camphor and 5 of milk of sulphur in 50 parts of rose water.

Hoefeld's Freckle Specific is—(*a*) 15 grams of white precipitate ointment mixed with a little wax; (*b*) a wash containing 0·24 gram of camphor, 8·0 of benzoin tincture, 15·0 of soap spirit, and 125·0 of rose water.

Kimball's Freckle Specific is a solution of 1 part of potassium acetate in 50 parts of water, mixed with a little rose oil and alcohol.

Reidl's Freckle Ointment consists of—Paraffin, 18 parts; almond oil, 6; glycerin, 4; milk of sulphur, 2; colocynth tincture, 2; tannin, 1; with a few drops of thyme oil and rosemary oil.

Russ's Freckle Wash contains—Benzoin tincture, 1; Hofmann's balsam, 2; and rose water, 100 parts.

**Sesser's Medicinal Toilet Mystery, for imparting a juvenile freshness and beauty to the complexion—(*a*) 60**

grams of toilet wash cream, a mixture of fat, soap powder, and rose water; (*b*) toilet ice, a soft camphor-like ointment of fat, a little wax and spermaceti, and cocoanut oil; (*c*) 100 grams of herb milk, consisting of rose water, a good deal of prepared talc, and a little glycerin and zinc oxide; (*d*) 60 grams of Teint Poudre, consisting of a mixture of talc with a small quantity of white magnesia, and tinted with cochineal.

Tecklenburg's Milk of Venus consists of 5 parts of benzoin tincture and 200 of rose water.

Polt & Gruber's Venus Paste consists of 50 per cent. of a mixture of lard and cocoa butter, 6 per cent. of soap powder, 12 per cent. of glycerin, 3 per cent. of white levigated bole, 5 per cent. of gum arabic, 1½ per cent. of styrax or benzoin, 2½ per cent. of water; the whole scented with various ethereal oils.

Grecian Water, a cosmetic, consists of 189 parts of scented water with about 7½ parts of white precipitate, and may be poisonous.

Manicere is a paste of zinc oxide and carmine, scented with bergamot oil.

Vincent's Poudre Rofraichissante consists of tartaric acid and sodium bicarbonate.

SECRET PREPARATIONS FOR THE TEETH, MOUTH, ETC.

Odol.—According to the investigations of the Breslau Testing Station, this preparation contains—80 per cent. alcohol, 97 parts; salol, 2½; saccharin, 0·004; peppermint oil, 0·5, with a trace of clove oil and caraway oil. The active ingredient is therefore salol, which has an antiseptic action.

Ulrich's Mouth Wash is an aqueous solution of salammoniac and potassium chloride, treated with a little spirits of camphor and alcohol until clear. It is of no real importance.

Rothe's Tooth Wash contains peppermint oil, carbolic acid, and strong alcohol. Is useless for the preservation of the teeth.

Harting's Mouth and Tooth Wash consists of eau de Cologne, alcohol, and carbolic acid. Is highly unsuitable for the purposes in view.

Dettroit's Tooth Essence and Tooth Balsam contains peppermint oil and carbolic acid in addition to alcohol. Is highly unsuitable for the purposes specified.

Eau dentifricé aromatique pour entretenir la beauté des dents is a mixture of ratanhia extract, cinnamon, aniseed, and peppermint oil.

Sach's Mouth Wash consists of ratanhia extract, peppermint oil, myrrh, and alcohol.

Ebermann's Mouth Wash is a mixture of ratanhia extract, alcohol, clove oil, and peppermint oil.

Bergmann's Tooth Wash is a reddish liquid containing alcohol, peppermint oil, and aniseed oil.

Van Buskirk's Tragacanth-Sozodont consists of—Alcohol, 30 grams; water, 45; soap, 7½ grams; and 2 drops of wintergreen oil. The soap is dissolved in the alcoholic mixture, then coloured with an extract of red santal wood, the wintergreen oil is added, and the liquid made up to 400 grams with water. The tooth powder used with this preparation consists of—Kieselguhr, 40 parts; powdered violet root, 125; and precipitated chalk, 250 parts, slightly scented with clove oil. Is, on the whole, an ordinary tooth soap; but the addition of kieselguhr is objectionable, owing to its attritive action on the teeth.

Cosmine.—This mouth wash has the following composition:—Formaldehyde, 0·327 per cent.; alcohol, 58·04 per cent. by weight; water, 41·0 per cent.; extract of myrrh and ratanhia, 0·32 per cent.; saccharin, 0·027 per cent.; with a little ethereal oil. The liquid is of a red colour, and smells of peppermint and geranium oil. There are, however, much better and perfectly harmless mouth washes.

Abraham's Formagene, for filling decayed teeth, consists of two small bottles containing 2½ grams, the one being filled with a mixture of creosote and clove oil, with a little phenol and alcoholic solution of formaldehyde. The other contains 2 grams of a yellowish white powder, free from organic matter, and setting like cement when mixed with water. It has the composition—Silica, 8·44 per cent.; carbon dioxide, 19·84 per cent.; alumina, 7·06 per cent.; lime, 52·46 per cent.; magnesia, 2·58 per cent.; and zinc oxide, 7·52 per cent. The alumina is certainly present in the form of silicate, the magnesia and part of the lime as carbonates, and the rest of the lime—23·9 per cent.—as oxide. Traces of iron and potassium compounds are also detectable.

Agathodont Mouth Wash consists of an extract of 10·0 goosefoot, 5·0 Para cress, 3·0 pyrethrum in 100·0 spirit, with 1 per cent. of salicylic acid. The latter alone is of any efficacy, the other ingredients being worthless; salicylic acid, however, is not to be recommended as a mouth wash.

Algotine, a mouth and tooth wash, is an aqueous solution of saltpetre, rendered aromatic by peppermint oil, myrrh tincture, and cinnamon tincture.

Popp's Anatherine Mouth Water.—Myrrh, 1 part; guaiacum resin, 4; saltpetre, 1,—macerated in 120 parts of corn brandy and 180 of scurvy grass spirit for one night, then distilled to 240 parts of distillate; to which are added 1 part each of rue, scurvy grass, rose leaves, black mustard, horse radish, pyrethrum, chinchona bark, lycopodium, sage, betiver root, and alkanna root. The whole is digested for fourteen days, then strained, filtered, and 1 part of spirits of nitric ether is added to each 120 parts of the filtrate. Notwithstanding the trouble involved in its production, this preparation is of no importance.

Antiscorbutic Water, a mouth wash, is a mixture of 5 drops each of orange peel oil, mace oil, curly-mint oil, and sage oil, with 2 grams of mustard oil and 100 grams each of scurvy grass spirit and ordinary dilute alcohol.

Jackson's Balsam Water, for the mouth, is a distillate from benzoin, guaiacum resin, myrrh, tolu balsam, orange peel, angelica root, cinnamon, vanilla, and peppermint; coloured with alkanna red, and qualified with scurvy grass spirit. Despite—or rather, *because of*—the number of ingredients, the preparation is worthless.

Eau de Batot, a mouth wash, consists of 500 grams of cedar-wood tincture, 125 each of myrrh and ratanhia tincture, and 5 drops of peppermint oil.

Krohn's Fluid Ozone, a mouth wash, is an aqueous solution of sodium permanganate, contaminated with a little common salt and Glauber salt. There are far better mouth washes.

Pohlmann's Cosmetic Mouth Wash is prepared by digesting 8 parts each of aniseed and cinnamon, 4 parts each of guaiacum and benzoin, and ⅖ part of pyrethrum with 240 parts of highly rectified alcohol for several days, then filtering and adding ⅕ part of peppermint oil and 30 parts of scurvy grass water.

Nail Powder, for polishing the finger nails, is a scented mixture of 200 parts zinc oxide and 2 of carmine.

Kothe's Tooth Beautifier is a mixture of 1 part alum with 3 of calcium carbonate, scented with peppermint oil. When old, the mixture also contains gypsum. Is certainly not to be recommended for the teeth.

Müller's Antiseptic Tooth Water consists of ¼ part thymol, 3 parts benzoic acid, 2 parts eucalyptus tincture, and 750 parts water.

Kothe's Tooth Wash is a solution of 0·3 parts of salicylic acid (containing carbolic acid) in 100 of 65 per cent. alcohol, a few drops of peppermint oil being added.

Pauli's Azymol is an antiseptic for the mouth and skin. According to the tests made at the Aufrecht Chemical and Bacteriological Institute, Berlin, it chiefly consists of a spirituous solution of salicylc acid, saccharin, vanillin, and menthol, presumably containing ratanhia tincture and peppermint oil, and coloured with fuchsin. A similar product would be furnished by the following recipe:—

| | |
|---|---|
| Menthol | 1·0 gram. |
| Peppermint oil | 2·0 grams. |
| Saccharin | 1·0 gram. |
| Vanillin | 0·5 ,, |
| Fuchsin | trace. |
| Ratanhia tincture | 4·0—50 grams. |
| 96 per cent. spirit | 92·0 ,, |

# CHAPTER XI

## TESTING AND EXAMINING THE MATERIALS EMPLOYED IN THE MANUFACTURE OF COSMETICS

THE present section will deal with the testing of such materials as have not already been sufficiently treated of in this connection earlier in the book. A little repetition is inevitable.

Value is chiefly laid on the methods affording a ready means of detection and recognition.

Adulteration of olive oil with oils from the seeds of cruciferous plants can be detected by the sulphur present in the latter. With this object, 1-2 grams of caustic soda are dissolved in 20-30 grams distilled water, and heated to gentle boiling with 30 grams of the suspected oil, the mixture being stirred with a piece of bright silver plate. If cruciferous oils be present, the silver will become tarnished with black specks of silver sulphide.

As, however, it is often the custom to clean out olive oil casks with lyes containing sulphur, it is advisable, before applying the above test, to wash the oil with hot water, and examine the washings for sulphur. If the latter be present, it may be eliminated from the oil by repeated washings with hot water.

Commercial glycerin is somewhat impure, yellow, malodorous; and, since pure glycerin is preferable for most purposes, it may be purified in the following manner:—

The glycerin is first diluted with—preferably distilled—

water, then shaken up for some time with coarsely granulated animal charcoal, and filtered through loose asbestos, the filtrate being then concentrated to syrupy consistence on the water bath.

Pure glycerin should be inodorous, syrupy, and not darker than a dull amber yellow; nor should it redden blue litmus paper. Glycerin with an acid reaction is unsuitable for use. When heated on a clean platinum plate, it should volatilise completely, without leaving any residue. Glycerin contaminated with grape sugar or saccharose leaves a black carbonaceous residue, frequently of considerable amount. When glycerin is rubbed between the fingers it should not give off any fatty odour, nor should it turn brown or give brown precipitate when treated with its own volume of concentrated sulphuric acid.

Glycerin adulterated with syrup is insoluble in two vols. of a mixture (1-2) of ether and alcohol, whereas pure glycerin is completely soluble therein.

Commercial glycerin frequently contains lime, which spoils it for use for many purposes, internal application in particular. This lime is due to the fact that in the saponification process the tallow is treated with a little lime and water under very high pressure in closed vessels, the resulting water separating from the lime soap being freed from lime by oxalic acid. The presence of lime in glycerin is detected by the following test:—The glycerin is treated with an equal volume of alcohol containing $\frac{1}{100}$ of sulphuric acid, and left for several hours; a precipitate indicates lime. Another test is by treating the glycerin with ammonium, oxalate, which renders it turbid when lime is present.

In some cases commercial glycerin is purified by dilution with its own volume of water, and boiling for forty-eight hours with finely powdered litharge; then filtered, and the dissolved lead thrown down from the filtrate by sulphuretted hydrogen gas, the treatment being completed by filtering through coarse bone black, and concentrating to syrup on the water bath. When the lead has not been completely removed, the glycerin will give a black or brownish turbidity with yellow ammonium sulphide, whereas pure glycerin remains clear.

The percentage of water in glycerin is determined by heating a given weight at 110° C. for an hour and then weighing.

Organic impurities can be detected by mixing the glycerin with 2 vols. of water and adding lead acetate. The amount of the precipitate will be in accordance with the quantity of impurities present.

As already stated, brown and yellow glycerin is adulterated with molasses, white glycerin with glucose. This can be detected by agitation with chloroform, the sugar settling down to the bottom, leaving the insoluble glycerin floating above.

Sodium bichromate gives no coloration when warmed with pure glycerin.

When shaken up with an equal volume of water, glycerin froths the more abundantly in proportion to the amount of impurities present.

For testing lanolin, Astolfi recommends a method based on comparative colorimetric tests, and capable of being extended to a quantitative process. He treats 0·1 gram of lanolin with 10 c.c. of concentrated sulphuric acid, and thus obtains an intensely red liquid with greenish fluorescence. When the lanolin is adulterated, the intensity of this coloration diminishes in proportion as the non-cholesterin adjuncts increase. On shaking the liquid up with 10 c.c. of chloroform, the latter assumes a bright red colour when the sample is pure, but is less red when water, extraneous fats, etc., are present. Also a black ring is observable at the plane of contact between the two liquids when the lanolin is pure, but is less decided in adulterated samples. On comparing these results with those furnished by pure wool fat under the same treatment, an approximate idea of the extent of adulteration in any sample may be gained.

Testing the purity of Soap Powder.—A reagent is prepared by mixing 50 c.c. of 85 per cent. alcohol and 50 c.c. of concentrated acetic acid, 15 c.c. of which are then added to 1 gram of the soap powder, the whole being shaken up and heated to boiling.

Pure soap powder gives an almost clear solution, any impurities settling down to the bottom. The clear liquid is poured off and diluted with 2 vols. of water, whereupon the fatty acids collect as an oily layer on the surface. Soda, chalk, and magnesia, the usual adulterants, effervesce when dissolved in the acid reagent.

A simple method of testing the purity of benzine consists in dipping a cotton rag in the sample of benzine, and then allowing the latter to evaporate without moving the rag. If the benzine be pure, scarcely any smell will remain; but the longer and more strongly the cotton rag smells after the benzine has evaporated, the greater the impurity of the latter, and the less is it suitable for cosmetic purposes. Cotton will retain the smell of benzine far longer than wool.

Testing Bitter Almond Oil.—In addition to the particulars given in the section on materials, the following simple test may be mentioned:—A drop of the oil is applied to filter paper, which is then ignited, and the vapours caught in an inverted moist beaker. On rinsing out with water, filtering, and adding silver nitrate, a white precipitate will indicate adulteration with artificial benzaldehyde, which invariably contains chlorine.

A good test for artificial water of bitter almonds, based on the presence of chlorine products in commercial benzaldehyde, is afforded by a solution of hydrogen peroxide containing pure sodium peroxide, but free from hydrochloric acid. This reagent oxidises benzaldehyde to benzoic acid even at a moderate temperature, the latter then combining with the sodium, so that even an aldehyde chlorinated in the benzol nucleus is retained. For this test 10 c.c. of the suspected water is mixed with 20 c.c. of hydrogen peroxide solution (free from HCl), and treated with 2-3 grams of pure sodium hydroxide free from chlorine, the whole being warmed to 40-50° C. for fifteen to thirty minutes, until the odour of bitter almonds has entirely disappeared. The liquid is then evaporated to dryness, gently incinerated, the residue taken up with water supersaturated with nitric acid, filtered, and the filtrate treated with silver nitrate solution. Water distilled from almonds will give not more than an insignificant opalescence under this test, even after long standing; but a decided chlorine reaction will be obtained if commercial benzaldehyde has been used. The same test may also be employed for testing bitter almond oil, 2-3 drops of the oil being taken.

The best water of bitter almonds is that prepared by long distillation, and containing 0·6-0·7 per cent. of benzaldehyde; since such a water will keep the longest, and will allow the action of the benzaldehyde-cyanhydrin to be exerted most completely.

Testing ethereal oil of Cherry Laurel and Bitter Almonds.—Hager recommends the following method for detecting adulteration with other ethereal oils, and distinguishing artificial water of bitter almonds:—

Five drops of the oil are dissolved in 2 c.c. of alcohol and treated with 2-3 drops of a 10 per cent. solution of mercurous nitrate. No reduction occurs in the case of natural or artificial cherry laurel oil or ethereal oil of bitter almonds; but when other oils are present, a grey precipitate is at once formed. This, however, does not apply to Ol. Cassiae cin., Succini, Petran, Lithantracis, Vincæ, Vitis vinifer, and wintergreen oils,—these, therefore, and phenol being undetected by the above test. In such cases the almond oil under examination is dissolved in 6 vols. of dilute alcohol (sp. gr. 0·895), a turbidity then indicating adulteration with one of the oils mentioned.

Cherry laurel oil gives a clear solution with 3 vols. of the alcoholic solvent. Artificial water of bitter almonds—2-3 c.c.—will generally give with 3 drops of mercurous nitrate solution a faint white or grey turbidity, the distilled water giving an immediate dark grey coloration or turbidity with this reagent.

The purity of petroleum jelly may be tested, according to Michle, by dissolving 2 grams in 5 grams of chloroform, shaking up with 10 c.c. of water, and adding 1 drop of phenolphthalein solution. Pure petroleum jelly, free from acid and alkali, will not give any colour change, but a strong red coloration ensues on adding 1 drop of $\frac{n}{10}$ potash.

On stirring 10 grams of petroleum jelly with 10 of water for a quarter of an hour on the water bath, leaving to cool, and pouring off the water, the latter should be perfectly neutral, give no sulphuric acid reaction with barium chloride, and leave no ponderable residue when evaporated on a watch-glass. Petroleum jelly is browned by 98 per cent. sulphuric acid on the water bath, but weaker—73 per cent.—acid has no action except when a badly purified—technical—petroleum jelly is present.

The best way is to melt 10 grams of the petroleum jelly in the water bath, and add 50 drops of 73 per cent. sulphuric acid, continuing to heat and stir the mixture for a quarter of an hour. Pure petroleum jelly will not alter the acid, neither colouring it brown nor forming a dark ring at the plane of contact on settling. If 5 grams of petroleum jelly are heated half an hour, with stirring, on the water bath, along with 5 grams of sodium carbonate and 25 grams of water, the solution being poured off when cold and supersaturated with dilute hydrochloric acid, it will remain clear, provided neither resins nor fatty acids be present.

For the rapid determination of menthol in peppermint oil, Kleber recommends—

About 5 grams of the oil, accurately weighed, are treated with a known quantity—about 5 c.c.—of acetic anhydride, and boiled for half an hour under a reflux condenser. In the meantime a similar quantity of the acetic anhydride is titrated with normal caustic soda and phenolphthalein. After the boiled liquid has cooled down, the condenser is rinsed with water, which is added to the acetylated mixture, the latter being then titrated with normal caustic potash. The difference in the number of c.c. consumed in the two titrations when multiplied by 0·156 gives the amount of menthol in the oil. The entire operation does not take more than fifty minutes.

The following observations on the effect of various medicinal substances on the teeth have been published by Maurel:—

Copper sulphate turns the sound enamel of the teeth a muddy yellow colour; it seems to attack the cement, and stains both this and the dentine a permanent green, which shows through the enamel.

Potassium chlorate has no action on the teeth.

Silver nitrate does not corrode the teeth, but imparts a black metallic sheen thereto.

Alum is very destructive to the enamel. Its action on the dentine and cement varies, and is but weak; the cement is less affected than the dentine.

Alcohol has no action on dental enamel.

Benzoin tincture does not affect the structure, but, when constantly used, colours the dentine and cement brown.

Peppermint tincture does not affect the hard tissue, but stains the roots of the teeth brown.

Eau de Cologne has no action.

Tobacco juice does not act on the structure of the teeth, but stains them more or less brown. The enamel is only slightly affected.

Ordinary white wax paper for wrapping cosmetic preparations can be prepared in different ways, the simplest being to melt white wax at a temperature of over 100° C.

on a brine bath, and when very fluid a fine soft paper is drawn quickly through the wax, or the latter is applied by the brush. This gives the best, but most brittle, kind of wax paper. The brittleness may be diminished by mixing the wax with other suitable ingredients; such as 1 part of liquefied white Venice turpentine and ½ part of bleached caoutchouc to 10 part of white wax, the whole being melted on the water bath. This mixture, applied with a wide brush whilst hot, gives a paper that will not crack even when folded, and will stand moisture and water very well. When cold, the covering of wax can be beautifully polished by rubbing with a soft cloth.

Since it is impossible to print on waxed paper, the paper must be printed before waxing, water inks being generally used, since these are less affected by the hot wax than oil inks.

The following official (Excise) test for alcoholic perfumes and cosmetic washes, the alcohol content of which cannot be ascertained immediately, is prescribed in Germany:—

Fifty grams of the perfume, or the like, are well shaken up in a separating funnel with 50 grams of water and 50 of petroleum benzine (0·69-0·71 sp. gr.). After a rest of at least twelve hours, the gravity of the under stratum is determined with a Westphal balance or pyknometer at 15° C., and the amount of alcohol is calculated from the result, the percentage being obtained by multiplying by 2.

Should the perfume, etc., contain resin or other extractives, 50 grams are mixed with 50 grams of water, and from the mixture a quantity of not less than 90 grams is distilled, the distillate being made up to 100 grams with water, and treated as above. Acids, when present, are neutralised with caustic soda before distillation. Preparations rich in glycerin—*e.g.* brilliantine—are diluted with 2 vols of water, 150 grams of the diluted liquid being distilled to furnish about 100 grams, and made up to that quantity for treatment as in the other cases.

An empirical method of testing cosmetic liquids is by dilution with water to detect the oils by means of their divergent volatility. When a scented spirit or mouth wash is poured into a wine-glass of water, the oils are immediately separated, and spread over the surface of the water. On leaving the liquid uncovered, the oils are volatilised in succession, the lightest first and the heaviest last. This operation may take some weeks, and, in order to be able to check the various stages, it is necessary to have several glasses, which must be marked with the dates in order to prevent confusion, the mixing being performed at definite intervals.

Take, for example, a mouth wash. To examine this, a fresh mixture is prepared, containing 10 grams of water and 10 drops of the liquid, every day for a week. At the end of that time there will then be a collection of seven mixtures, each of which will have a different scent, according to the volatility of the ethereal oils present. The qualitative composition of the mixed oils can be fairly well ascertained by this test.

In the foregoing case the predominance of peppermint oil soon disappears and other oils make their appearance, vanishing in their turn, so that the seven glasses form a whole gamut of characteristic odours, until, finally, the most stable of all are alone apparent. In this way, by a little experience, a bouquet can be easily analysed into its component scents.

Of course, the difficulty is greater when oils of equal volatility are present; nevertheless, even in this event a careful examination will enable a fairly reliable estimate to be formed.

The same method is also to some extent quantitative, so far as the comparison of scented liquids is in question. According to the quantity of oils present, the greater or narrower will be the turbid zone upon the water; and although this may be disturbed by the presence of other substances, it nevertheless gives some idea of the quantity of the oils when the odour is also taken into consideration. Of course, the same proportions must be maintained in the test mixtures, and the number of drops of the essences carefully counted with a dropping-glass.

When it is believed that the different oils have been identified, a mixture is made in accordance with the recipe thus obtained; but alcoholic dilutions of the various oils are used to prevent the results being spoiled by an irremovable excess of any constituent.

The method, however, entails patience, time, and the possession of an experienced and critical faculty of smell: and the odour of the mixture must be tested at frequent intervals, success being often attained suddenly.

THE END.

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# CHAPTER VIII

## COSMETIC ADJUNCTS AND SPECIALTIES

IN this section we will deal with certain artificial essences which are frequently used as adjuncts to cosmetic preparations.

The preparation of ionone will be considered first. The odoriferous principle of the violet-root cannot be obtained direct by steam distillation, owing to the large percentage of starch present, which apparently retards the escape of the volatile constituents. For this reason Tiemann and Krueger extract the root repeatedly with ether, and then subject the ethereal extract to distillation with steam. This furnishes two products: a muddy residue, which, when treated with alkalis, yields myristic or iridic acid, and a brittle crystalline resin; whilst the distillate contains the ethereal oil together with a larger quantity of myristic acid and its methyl salt, oleic acid and an ester of same, aldehydes, and other substances. The ethereal solution of this mixture is shaken up with a 2 per cent. solution of caustic potash, in order to remove part of the free organic acids. The residual organic acids and esters are more speedily eliminated by repeated fractional distillation of the oil with steam. The neutral oil obtained by this process of distillation is then dissolved in alcohol, and treated with an alcoholic solution of caustic potash at the ordinary temperature. This alcoholic solution is poured into water, the aqueous solution is extracted with ether, and the ethereal solution again distilled with steam, the perfume thereupon passing over with the first portions of the distillate. The resulting oil is then boiled with an aqueous solution of silver nitrate. The irisketone is next clarified by the formation of a phenylhydrazine compound, left to stand for a day, and the hydrazone mixture then subjected to steam distillation, which leaves the irisketone behind, in combination with phenylhydrazine as a brown oil, which can then be decomposed into phenylhydrazine and ionone by dilute sulphuric acid, the ionone being extracted with ether and rectified under a low pressure. Ionone is an oil which dissolves badly in water, but readily in alcohol, ether, chloroform, benzol, or ligroin, and has the sp. gr. 0·939. The aroma of the pure substance is sharp, and, when highly concentrated, quite different to the scent of violets. However, on dilution with alcohol and exposure to the air, it at once exhibits the odour of the natural blossoms.

Artificial essence of violets is obtained by the following method:—

Ten kilos of acetone and 30 grams of citral are dissolved in 100 kilos of benzol, and to the solution is added 5 kilos of a 10 per cent. solution of sodium ethyl. The mixture heats spontaneously and turns red. After twenty-four hours the mixture is shaken up with water, whereupon a portion separates out on the surface of the latter. This portion is then collected and distilled with steam until the smell has disappeared. The residue is boiled with 15 parts of 7 per cent. sulphuric acid, poured out when cold, neutralised, and finally distilled. The result is a pale yellow liquid which in a concentrated state smells like santal, but when considerably diluted assumes a pure odour of violets.

Artificial vanilla essence is prepared as follows:—
3·75 parts (grams) of Peru balsam, 1·75 c.c. of orange oil, 125 grams of violet-root essence, 62 grams of powdered Tonka bean, 30 drops of musk tincture, 250 c.c.

of rectified spirit, 10 grams of magnesia, 125 c.c. of water. The balsam and oil are dissolved in 60 c.c. of spirit and triturated with the magnesia, this mixture being then added to the rest of the ingredients, and the whole kept in a warm place for four weeks, to be finally coloured with caramel, and filtered.

Musk Tincture for cosmetic purposes.—Hauer gives the following recipe for this purpose:—

2·5 parts of musk with the musk bag, or 2·0 parts without the bag, and 2 parts of powdered sugar, are placed in a flask and suffused with 10 parts of boiling water containing 0·3 part of sodium carbonate, and are left to stand therein for a day. Hereupon 35 parts of spirit are added, macerated for fourteen days, and then filtered. This process gives a strong tincture of musk, in which the whole of the musk, except the skin, is dissolved.

An excellent eau de Cologne can be obtained by the recipe given by Fehr.

The following ingredients are dissolved in 23 kilos of finest spirit of wine:—

| | |
|---|---|
| Lemon oil ... ... ... ... | 350 grams. |
| Bergamot oil ... ... ... ... | 270 ,, |
| Finest French lavender oil ... ... | 20 ,, |
| Peppermint oil ... ... ... ... | 12 ,, |
| Acetic ether ... ... ... ... | 12 ,, |
| Neroli oil ... ... ... ... | 120 drops. |
| Best French oil of thyme ... ... | 100 ,, |
| Best French rosemary oil ... ... | 100 ,, |
| Rose oil ... ... ... ... | 20 ,, |

After a few days are added—

| | |
|---|---|
| Triple orange-flower water ... ... | 1100 grams. |
| Triple rose water ... ... ... | 200 ,, |

This preparation furnishes a successful imitation of the renowned product of J. M. Farina, "opposite the Julichsplatz," Cologne. If the predominant odour of rosemary oil be objected to, the amount of this oil may be diminished. After keeping the preparation for three months, it will need an addition of 5-7½ kilos of spirit, after which it must be stored for another three months before being sold.

Eau de Cologne, in any case, should be kept for a year before it is sold; and under these conditions inferior recipes even will furnish really good qualities of this scent.

### COLOURING COSMETIC PREPARATIONS

For this purpose the employment of betulin has recently been proposed.

If the roots of *Betula alba* be boiled with an alkali, and the filtered dark-red decoction be treated with hydrochloric acid, a precipitate—up to 20 per cent.—is obtained, which, when well washed and carefully dried, furnishes a reddish brown powder, with an odour of leather and a faintly bitter taste. This product is known as betulin, and, when dissolved, forms an excellent colouring matter for cosmetic preparations.

The best method of procedure is to triturate 0·05 gram of betulin in a porcelain mortar, under gradual addition of 5 grams of 90 per cent. alcohol, containing a little glycerin, until complete solution is obtained. The product is made up to 20 grams with distilled water, and thus gives a handsome red-brown liquid, which may be further diluted with water, though the larger the proportion of alcohol the better the colour. A slight addition of alcohol increases the tinctorial power, whereas acid has the opposite effect, and, if added to a solution already extensively diluted with water, will throw down the colouring matter. Nitric acid precipitates the colouring matter as a violet-red deposit, the same colour being also assumed by the alcoholic solution. The colouring matter is not precipitated by organic acids, but is thrown down by aqueous solutions of sulphate of quinine and lead acetate, whilst ferric chloride gives a greenish black coloration.

With regard to other colouring matters, the following remarks may be made:—

For all alcoholic cosmetic preparations and such as contain glycerin, the aniline dyes are the best colouring matters; on the other hand, they are unsuitable for such cosmetic articles as contain fat, whether animal or vegetable fat is immaterial. Of course, the aniline dyes used must be guaranteed pure, and especially free from arsenic; a guarantee which the large firms of colour makers will certainly be able to give.

Yellow colouring matters for this purpose are saffron, turmeric, and palm oil.

Saffron gives a dark yellow or orange colouring material, which is readily soluble in alcohol, and also in petroleum ether, and is absorbed by fats. The finely comminuted saffron is preferably digested with petroleum ether, the solvent being then removed by distillation, and the final traces allowed to escape spontaneously; this method furnishes the pure colouring matter, which is easily miscible with fat. The colouring matter of saffron can also be prepared by digestion with melted lard or almond oil.

Turmeric, the yellow colouring matter of curcuma (turmeric) root, is recovered by extracting the root with alcohol or petroleum ether in the same manner as saffron. It is unsuitable for preparations containing alkalis, since these substances turn the colour brownish red.

Palm oil imparts its yellow colour to the soaps prepared from this fat; but the colouring matter is completely bleached on exposing the soap in a damp state to the air for some time.

The chief red colouring matter is carmine, and this is best prepared by treating finely powdered cochineal with ammonia, adding a little dissolved alum, and exposing to the air and direct sunlight, whereupon the colouring matter will be deposited in the form of red flakes, which are collected and dried.

Carthamine red is contained in the flowers of the marigold. There are two colouring matters, one yellow and one red. The former is extracted from the dried flowers by means of water, the red colouring matter being then recovered from the residue by treating the latter with a weak solution of soda. On carefully diluting this solution with acetic acid, a precipitate of safflower red is obtained, and, when dried, forms a mass exhibiting a metallic greenish lustre, and furnishing a red powder, which is used for Rouge en Feuilles or Rouge en Tasses.

Alkanna is obtained from the root of the same name, the red colouring matter being extracted with petroleum ether; it is also soluble in melted lard or warm oils.

Ratanhia root yields a reddish brown colouring matter which is soluble in alcohol, and can be recovered by extraction with that solvent. In the preparation of tooth tinctures and mouth washes, for which ratanhia is a favourite colouring agent, use is often made of finely grated red santal wood or Pernambuco wood, both of which, in addition to their content of astringent matters, —tannins,—also yield a handsome colouring matter to alcohol.

Green colours are produced by the aid of chlorophyll, which can be easily prepared by treating triturated leaves with alcohol, and evaporating the solvent. In preparing green powders, use is often made of dried and pulverised leaves of brilliant green colour, among those most suitable being spinach, laurel, celery, and parsley leaves. Soaps are coloured green by a mixture of yellow and blue, a yellow soap being melted and treated with an addition of finest smalt and ultramarine until the desired shade of green is produced. Indigo-carmine must not be used for this purpose, as it would stain the skin blue when the soap came to be used.

Smalt or ultramarine is used for producing blue in many cosmetic preparations, but both are insoluble. The only soluble blues are aniline blue and indigo-carmine, but the latter can only be used for colouring pomades. It is prepared by suffusing perfectly dry, finely powdered indigo with fuming sulphuric acid, and, at the end of twenty-four hours, adding finely powdered chalk until effervescence ceases, after which the preparation is filtered.

Violet is produced by suitably mixing a red and a blue colouring matter.

Brown is imparted to cosmetic preparations by means of caramel, produced by heating sugar in an iron pan until converted into a deep black mass, that has a brown appearance only when viewed in thin layers. Caramel is soluble in water, but not in alcohol; it may also be employed for colouring soap.

Black is produced almost exclusively by finely pulverised vine charcoal or ivory black. Liquids are coloured black by the aid of Indian ink.

### COSMETIC SPECIALTIES

The manufacture of special preparations seems to be a very profitable business in all branches where it can be carried on, provided that the products themselves are perfectly unobjectionable in every sense, and that they are judiciously advertised—an absolutely indispensable condition under the circumstances of modern commerce. And in the case of cosmetic specialties—which in most instances seem to have developed into hygienic preparations—the prospects of a good reception and ready sale appear to be particularly bright.

As in the case of general cosmetics, the main question in connection with specialties is whether the preparations themselves are capable of fulfilling the objects for which they are produced; and if so, to what extent. It is therefore necessary to discover, in addition to ingredients that serve to improve either the external appearance or the mechanical perfection of the products such substances as may lay claim to specific action. If the preparation be deficient in ingredients of this latter class, or if their proportion be incorrectly selected, then the speciality in question will never meet with the desired reception, and will remain for the most part entirely inert.

Another point on which great care is necessary, is to see that none of the ingredients used are likely to have any action injurious to the health of the consumer; and in this respect, unfortunately, some cosmetics, especially those of a secret character, often leave much to be desired. In this connection, the manufacturer must possess a thorough knowledge of the properties of his ingredients, since the lay consumer is not in a position to judge whether the addition of this or that substance is injurious or not. The consumer, relying on the knowledge, skill, and experience of the manufacturer, makes use of the preparation in the manner and to the extent indicated in the printed instructions accompanying the package.

In considering the description and preparation of the specialties mentioned in the following pages, it will frequently be necessary to adopt a critical attitude in order to obtain a clear insight into the value and import of some among them. Such methods of preparation as are simple, and conducted in a matter-of-course manner, will be passed over briefly, fuller consideration being reserved for special methods, wherein any doubt might arise as to the right course of procedure, and where any lack of skill might endanger the success of the preparation.

Finally, it is perhaps almost superfluous to mention that, in the present age of luxury, very peculiar care should be bestowed on the manufacture of cosmetic specialties. Happily, the high state of development attained by the paper, glass, porcelain, and metal industries facilitates our task, so that, owing to the large available selection of tasty materials for packing, the only limitations imposed on the maker are those of personal taste, the appreciation of the article by the public, and —by no means least—the price at which the preparation can be sold.

First consideration will be devoted to

### SPECIALTIES IN HAIR WASHES

The premier place in this class must be accorded to hair dyes, which are largely prepared as specialties. Here the main point is to be sure that no ingredients capable of producing injury to health are present.

Broers has made experiments with various innocuous dyes for the hair. The employment of sodium sulphide and bismuth subnitrate imparts a hateful grey appearance to the hair. Potassium permanganate, in the condition of a 1 per cent. aqueous solution, forms a fairly powerful brownish blonde dye.

A 5-10 per cent. aqueous solution of walnut shells or walnut leaves has no effect, neither is Indian ink of any use, the colour being removed by washing with water.

On the other hand, better results are furnished by henna, the leaves of *Lawsonia inermis*. The powdered leaves are stirred up to a pulp with water, applied to the hair with a brush, and afterwards washed off again. The longer the henna acts on the hair, the darker is the dye; the colour varies from light brown to orange red. After an exposure to the dye for forty-five minutes, the hair becomes pale brown; after four hours it is red-brown to golden blonde,—a shade greatly in favour among the ladies,—and after twenty-four hours is orange red and unnatural looking. This possibility of regulating the colour by the time of the exposure, renders henna specially adapted for use as a hair dye.

Notwithstanding the unfavourable results mentioned above as having been obtained by the use of the harmless ingredient, walnut shells, a few recipes in which these appear are now given.

### HAIR DYE FROM WALNUT SHELLS

| | | |
|---|---|---|
| Green walnut shells | 450 | ,, |
| Powdered alum | 30 | ,, |
| Rose water | 120 | ,, |

The ingredients are triturated together in a mortar, pressed, and treated with 90 per cent. alcohol in the proportion of 30 parts per 100 of liquid, the mixture being then left for four days in a close vessel, and finally filtered and scented to taste.

### WALNUT HAIR OIL

| | | |
|---|---|---|
| Green walnut shells | 120 | grams. |
| Powdered alum... | 15 | ,, |
| Olive oil | 600 | ,, |

triturated in a mortar, then warmed on a sand bath, with continued stirring, until all the moisture has been dissipated, and afterwards pressed, strained, and perfumed to taste.

### WALNUT POMADE

| | | |
|---|---|---|
| Green walnut shells | 450 | grams. |
| Powdered alum... | 60 | ,, |
| Olive oil | 720 | ,, |
| Palm oil | 120 | ,, |
| White wax | 90 | ,, |

warmed on a sand bath, with stirring, until all moisture has been driven off, then strained, and, when nearly cold, mixed with 300 parts of pomade, previously melted on the water bath.

### EXTRACT OF WALNUT SHELLS

The freshly peeled shells from green walnuts are lixiviated with ammoniacal water,—2 : 1,—the menstrum being concentrated to the consistence of syrup, then diluted with suitably scented spirit,—2 : 1,—and, if necessary, treated with an addition of 2 per cent. of pyrogallic acid, the latter increasing the rapidity of the dye. Before applying this dye, the hair must have been freed from grease and thoroughly dried.

Another recipe runs as follows:—The green outer shells, which can be obtained cheap at the time the walnuts ripen, are pounded with a pestle and then suffused with water containing 1 per cent. of salt. After three days the whole is poured into a large pan, on which a mark is then made to show the height of the liquid, it being necessary to replace the water lost by evaporation. The liquid is heated to near boiling point for four to six hours, then left to cool down, and well pressed. In the absence of a press, this may be done with the aid of a fine linen cloth, or preferably a sack of flax canvas, about 40 inches long and 20 inches wide, which is half filled with the mass from the pan, held over an open vessel, tied up at the mouth, and twisted by means of a couple of sticks, two men being required for the operation. Nevertheless, the bag must not be twisted so tightly as to cause it to burst. The liquid thus obtained is returned to the pan, and is concentrated to one-fourth its initial volume, which is measured for that purpose, the best plan being to place a quantity of water equal to one quarter of the liquid in the pan, marking the level, pouring out the water again, and then allowing the nut liquor to evaporate until the level of the mark is reached. The finished extract then receives an addition of 10 per cent. of 95 per cent. alcohol, and is either stored in tightly closed vessels, for stock, or finished off, ready for use, by the addition of some perfume.

### LANOLIN ROSE CREAM

This preparation for the hair is compounded from lanolin, 25; almond oil, 60; potash soap, 7¾, melted together, stirred up with 150 parts of water and 30 of rose water whilst cooling; and finally scented with essence of roses.

### A HARMLESS HAIR DYE

An innocuous dye, to be applied with the brush morning and evening after using an alkaline wash, is composed of—

| | |
|---|---|
| Pyrogallic acid ... ... ... ... | 4 grams. |
| Citric acid ... ... ... ... | 0·3 ,, |
| Boroglycerin ... ... ... ... | 19 ,, |
| Distilled water ... ... ... ... | 90 ,, |

### AUREOL

Aureol for dyeing the hair has proved itself a thoroughly harmless preparation, is very stable, and the colour is not altered, even by soap. It consists of 1 per cent. of methol, 0·3 per cent. of amidophenol chlorate, and 0·6 per cent. of monoamidophenylamine all dissolved in 50 per cent. of alcohol containing 0·5 per cent. of sodium sulphite.

The hair must be first washed with soap or soda, to remove all grease. The aureol is then mixed with an equal quantity of hydrogen peroxide, and applied, by means of a fine comb, to the still damp hair. At the end of two to three hours the hair assumes a handsome dark brown colour, which can be made still darker by repeating the application as desired.,

The so-called Turkish Water for dyeing the hair is prepared by kneading finely powdered gall nuts with a small quantity of oil to form a homogeneous paste, which is then roasted in an iron drum until the evolution of oil vapours has ceased. The residue is taken up with a little water and kept over a fire until perfectly dry. The mass, very slightly moistened, is then carefully mixed with a metallic powder and kept in a damp place, where its dyeing properties are gradually developed. The mixture is sometimes perfumed with ambergris or some essential oil.

To employ this preparation for dyeing the hair, eyebrows, eyelashes, or whiskers, a small quantity is crushed in the palm of the hand, or between the fingers, and carefully rubbed on the hair, etc. At the end of a few days a fine black colour will be developed, the hair remaining soft, glossy, and retaining its colour for a considerable time, even after a single application.

The tinctorial properties of this preparation are evidently largely due to the pyrogallic acid formed during the roasting of the gall nuts.

### AMERICAN HAIR WASHES

The popular American hair washes—shampoos—may be prepared from the following recipes:—

1. The white of two eggs is beaten to a froth, mixed with 150 grams of water and 90 grams of ammonia, and finally shaken up well with 10 grams of eau de Cologne and 120 grams of alcohol.

2. Finely powdered borax 60 grams and 40 grams of glycerin are triturated, mixed with 400 grams of rum and 300 grams of bay rum by stirring or shaking, and then incorporated with the whites of two eggs previously beaten up to a froth.

3. Ammonia, 15 c.c.; glycerin, 30 c.c.; soap spirit, 30 c.c.; 95 per cent. spirit, 60 c.c.; bergamot oil, 20 drops, and sufficient water to make a total volume of 500 c.c.

4. Ammonia, 30 c.c.; cantharides tincture, 15 c.c.; Paprica tincture, 15 c.c.; 95 per cent. spirit, 250 c.c.; water, 250 c.c.; bay rum, 500 c.c.

5. Ammonia, 15 c.c.; 95 per cent. spirit, 125 c.c.; a little scent, and enough water to make 250 c.c.

6. Alcohol, 50 c.c.; sulphate of quinine, 1 gram; cantharides tincture, 8 grams; borax, 3½ grams; ammonia, 3½ grams; glycerin, 100 c.c.; caramel solution, 3½ grams, and sufficient bay rum to make 500 c.c. This preparation is popular under the name "Compound Quinine and Glycerine Hair Tonic."

7. Castor-oil, 30 c.c.; bergamot oil, 40 drops; glycerin, 100 c.c.; cantharides tincture, 12 c.c.; ammonia, 12 c.c., and sufficient water to make 500 c.c. The oil is dissolved

in the alcohol, mixed with the tincture, and the mixture of ammonia and glycerin is gradually run in. The liquid is called "Eclectic Hair Tonic."

8. Sulphate of quinine, 1·75 c.c.; alcohol, 55 c.c.; cantharides tincture, 3½ grams; capsicum tincture, 1¾ grams; ammonia, 15 c.c.; glycerin, 30 c.c.; with sufficient bay rum to make 175 c.c. This preparation is known as "Quinine Hair Tonic."

Shampoo powder is a mixture of ammonium carbonate, 1; borax, 1; and Quillaya bark, 2 parts, with bay-leaf oil or some other perfume. It is made up in packets, with the following directions for use: "Put the powder into a covered jug along with a cupful of boiling water, close the lid, and leave the liquid to stand awhile until cool enough to use."

A popular specialty is Hair Curling Essence, though its efficacy is doubtful. The preparations mainly rely on the adhesive properties of gum, or on the removal of grease from the hair, followed by curling. The following recipes are recommended:—

## HAIR CURLING WASHES

1. Purest potash, 7 grams; ammonia, 3½; glycerin, 15; alcohol, 12; rose water, 550, with a little scent. The loosely tied or loose hair is moistened with this liquid, and will curl on drying.

2. Borax, 100 grams; gum arabic, 3½ grams; hot water, 1 litre; spirit of camphor, 45 c.c. The hair is moistened with this preparation at night.

3. Potash, 7 grams; ammonia, 3½; glycerin, 15 grams; rose water, ½ litre.

4. Gum arabic, 3½ grams; sugar, 3½ grams; rose water, 50 c.c. The hair is moistened with this liquid before retiring to rest, and is then done up in curl-papers.

5. 175 grams of tragacanth are digested, with frequent stirring, for forty-eight hours in 4½ litres of rose water,

then strained through a linen cloth, left for a few days to clarify, and scented with rose oil.

6. Dry potash, 7 grams; cochineal, 1¾ grams; ammonia, 3½ grams; rose spirit, 3½ grams; glycerin, 7 grams; rectified spirit, 75 c.c.; and distilled water, 500 c.c., are digested, with stirring, for a week, then decanted and filtered. The hair is moistened with this liquid, and then loosely tied up; the effect appears after drying.

| | | |
|---|---|---|
| Potassium carbonate ... ... ... | 12·0 | grams. |
| Ammonia ... ... ... ... | 7·5 | „ |
| Glycerin ... ... ... ... | 7·5 | „ |
| Rectified spirit ... ... ... ... | 50·0 | „ |
| Water sufficient to make... ... ... | 600·0 | „ |

The hair is moistened with the liquid, and then dried, whereupon it curls. All grease must have been removed from the hair beforehand by washing with soap.

M. Joseph recommends, as a harmless and simple hair dye, the use of a 1-20 per cent. argentum petroleum jelly, *i.e.*, an ointment prepared from yellow petroleum jelly with an addition of 1.20 per cent. of silver nitrate, according to the shade to be produced,—the silver salt having been dissolved in a minimum of water. This preparation is applied, by means of a comb, every eight to fourteen days.

A very profitable branch of specialties is that of

### PREPARATION FOR PROMOTING THE GROWTH OF THE HAIR

A preparation of this class which effectually counteracts the tendency of the hair to fall out, and can be confidently recommended, has been given by Dieterich, the recipe being as follows:—

Chloride of quinine, 0·4; tannin, 1·0; alcohol, 80·0; cantharides tincture, 1·0; glycerin, 60·0; eau de Cologne, 4·0; vanillin, 0·01; and sandal-wood powder, 0·005 gram. This liquid is left to stand for five days and then filtered. It should be employed to wash the hair every other day. The santal-wood powder may very well be omitted, in which case the long standing and the filtration are rendered unnecessary.

A hair pomade for the same purpose, and one that has proved efficient in preventing the hair falling out in cases of nervous headache, has been recommended by Leistikow. The composition is as follows:—Cantharides tincture, 3·0; chloral hydrate, 2·0; lanolin, 5·0; petroleum jelly, 10·0; cherry-laurel water, 10·0; and lime-water, 10·0 grams. The chloral hydrate is dissolved first, the lanolin and petroleum jelly liquefied by warmth, and the liquid ingredients added by degrees, and incorporated by constant stirring and mixing.

Another recommended specialty for the hair is

### SCURF SOAP

One hundred grams of Sapo viridis are dissolved, by the aid of warmth, in a mixture of 15 grams of glycerin, 50 grams of eau de Cologne, and 50 of rectified spirit, 3 grams of B-naphthol being added to the whole. The head is washed with this soap every second or third day.

### SPECIALTIES FOR THE BEARD AND WHISKERS

Pomade dye.—Twenty parts of stock soap are carefully melted on the water bath so as to prevent lathering, and then mixed with 3 parts of mucilage—1 part of gum arabic to 2 of water. To this is added the colouring matter, consisting, for brown whiskers, of mahogany-brown dye with a little vine black, or the latter alone for black beards, the whole being afterwards scented with a mixture of 20 parts of geranium oil, 10 of bergamot oil, 15 of clove oil, and 2 of cedar-wood oil. The preparation is cast into a mould, then cut up into small squares and packed in boxes lined with tinfoil; each box contains also a small brush for applying the pomade, and a looking-glass in the lid.

Tube pomade.—This is prepared in the following manner:—1000 of white wax, 500 of soap powder, 500 gum arabic, 625 of water, 20 of bergamot oil, 10 of sweet-orange oil, 2 drops of rose oil—to 2½ kilos.—The gum arabic is dissolved in the water, strained, and the mucilage added to the melted wax, the mixture being warmed up and mixed with the soap powder, the scent being added last of all.

A noteworthy cosmetic, suitable for the production of specialties, is

### GLYCERIN-GELATINE

To prepare this article, 8½ grams of gelatine are left to soak in 180 grams of rose water, then dissolved on the water bath, and mixed with 20 grams of egg albumin when cold. On heating the preparation up again, the solution clarifies, owing to the coaglution of the albumin; and it then receives an addition of 0·75 gram of salicylic acid dissolved in 180 grams of glycerin, to serve as a preservative. The whole is filtered through a hot-water filter, and packed, while warm, into wide-necked flasks, labelled "Glycerin Cream."

### BRILLIANTINE

This name is applied to cosmetics for glossing and stiffening the hair of the beard and forehead-fringe. The following recipes are suitable:—

1. Castor-oil, 6 grams; Venetian soap, 2; benzoin, 2; alcohol, 200; scented with a little rose or neroli oil.

2. Glycerin, 10; alcohol, 100; rose water, 100.

3. Castor-oil, 6; glycerin, 6; benzoin, 2; alcohol, 200, scented with a little rose oil or neroli oil.

4. (Solid Brilliantine), finest olive oil, 1 kilo; spermaceti, 300 grams; bergamot oil, 25; clove oil, 29; French geranium oil, 10 grams.

5. Glycerin, 6; castor-oil, 6; benzoin, 2, dissolved in 200 strong spirit. A little acetic acid is added, with suitable scent.

6. Melted white paraffin, 90; castor-oil, 10; Essence triple de Reseda—or another—30; 93 per cent. alcohol, 80; sufficient rose water or neroli water is then added to make the two liquids about equal.

7. Lanolin, 120 grams; spermaceti, 60; castor-oil, 350, are melted together, and, when cold, mixed with bitter-almond oil, 0·06 gram; clove oil, 0·06; and bergamot oil, 1·29 grams.

8. Spermaceti, 250 grams; almond oil, 1250 grams; lemon oil, 100 grams. The spermaceti is dissolved in the almond oil and mixed with the lemon oil, the whole being poured into hot vessels, which are allowed to cool very slowly in order to produce crystallisation.

9. Honey, 30 c.c.; glycerin, 15 c.c.; alcohol, 50 c.c.

Mouth washes are also a suitable article for specialties, a particularly profitable preparation being a

### FROTHING MOUTH WASH

compounded from powdered Quillaya bark, 50 grams; glycerin, 45 grams; sodium salicylate, 7 grams; bergamot oil, 1¾ grams; oil of wintergreen, 1¾ grams; clove oil, 10 drops; alcohol, 30 c.c., with sufficient carmine solution to colour the preparation, and enough dilute alcohol to make it up to 500 c.c. The powdered Quillaya bark is first macerated with dilute alcohol and glycerin and strained, the filterate being added to the ethereal oils dissolved in the alcohol. The mixture is next coloured with the carmine solution, shaken up with a little powdered talc, filtered until clear, and made up to the prescribed volume (500 c.c.) with dilute alcohol.

Equally to be recommended is the manufacture of

### MOUTH WASH TABLETS,

which meet with a ready sale, and seem worthy of attention. Bernegau gives the following recipe for this article: —Heliotropin, 0·01 gram; saccharin, 0·01 gram; salicylic acid, 0·10 gram; menthol, 1 gram; milk sugar, 5 grams; and sufficient alcohol (scented with rose oil) to make 100 tablets. The mass may be coloured red with eosine dye, green with chlorophyll, or blue with indigo-carmine.

Another specialty which is profitable, though not very closely related to cosmetics properly so called, is

### NERVE PENCIL

Mayet gives the following recipe:—Chloral hydrate, 1 part; menthol, 1 part; cocoa butter, 2 parts; spermaceti, 4 parts. The pencil is applied to the affected parts, or, in case of headache, rubbed on the forehead, and generally effects a complete cure, or at least considerably reduces the pain. The method of preparation is to melt the cocoa butter and spermaceti, then add the menthol and chloral hydrate, and cast the whole in moulds.

Among the class of rouge preparations, which has already been treated under general cosmetics, there are two which are suitable for specialties, namely,

### COSMETIC FOR THE HANDS AND VEINS

That for the hands is a concentrated liquid preparation, obtained by intimately mixing 100 grams of finest pure zinc white with fine talc, 100 grams; glycerin, 70; benzoin tincture, 20; heliotropin extract, 10; and rose water, 270 grams. However, unless coloured with a little carmine, the preparation imparts merely a rather cadaverous appearance to the hands, when viewed by artificial light particularly. A very good modification is that obtained from carmine, 0·4; talc, 30; precipitated chalk (which may be partly replaced by zinc white), 70; benzoin tincture, 40; and distilled water, 500-700, according to the price.

The vein cosmetic, which is chiefly used as a theatrical make-up, is compounded of white bole, 80; zinc white, 10; Berlin blue, 10; and gum arabic, 3 parts, mixed to a plastic mass with orange-flower water and made into sticks about ¼ inch in diameter.

Another class of special preparations in large demand, and which, if properly made, should be saleable to great advantage, besides being capable of producing the desired effect, is that of

### DEPILATORIES

In the first place, it must be premised that depilatories cannot prevent the re-growth of hair on places where it has been removed by their action; on the contrary, according to the author's experience, depilatories produce exactly the same result as shaving, the aftergrowth of the hair being accelerated. Nevertheless, depilatories are in large demand, ladies having a great objection to hairy growths on the face and arms. Numerous recipes for these preparations exist, but they are by no means all of equal value; furthermore, it should be borne prominently in mind that no substances capable of corroding or otherwise attacking or injuring the skin are permissible in depilatories. This point is the more important in view of the fact that, as already mentioned, depilatories require to be constantly employed when once their use is begun. The following recipes will be found best suited for the purpose in view, and also financially advantageous to the maker:—

1. Quicklime slaked with a little water, so as to furnish a friable powder, is stirred up to a thin pulp with a further quantity of water, and the mixture is saturated with a current of sulphuretted hydrogen gas. Ten grams of the resulting calcium sulphide are mixed with 5 grams each of starch and starch sugar and a little oil of lemon, to form a thick pulp, which is applied to the seat of the hairs and left in contact for twenty minutes, after which it is scraped off with a paper knife.

2. A practical and cheap depilatory can be prepared in the following manner:—Powdered barium sulphide,

1 part; precipitated chalk, 1 part. It is essential that both these ingredients should be perfectly dry and in a finely powdered condition, in order, on the one hand, to prevent the mixture becoming prematurely exhausted, and, on the other, to obviate irritation that might arise from the granular or sandy condition of the depilatory. If these precautions be observed, the product will consist of a very fine, light grey powder, which, on being made into a pulp with a little water, will act on the hair in three to four minutes, without any injury to the skin. It is also very cheap to produce. It is erroneous to suppose that the barium sulphide cannot be procured ready made, since the same can be obtained in any quantity.

3. Barium sulphide, 10 parts; zinc oxide, 5; and wheat starch, 5 parts, are triturated to a very fine powder, which is made up into a thick pulp with water before use, and is applied for about ten minutes.

The preparation of toilet powders has already been described, and, for the purposes of the present section, namely, specialties, it will be sufficient to deal with

### FACE POWDER

alone, in connection with which article the author's experience tends to show that the best of all face powders, and one calculated to prevent or remedy all impurities of the skin, is compounded solely of starch, talc, and salicylic acid.

In the subjoined recipes it is highly probable that the violet root therein mentioned could be advantageously replaced by some other ingredient, since this powder can never be obtained in such a finely divided state as the other constituents.

Violet powder.—Zinc white, 100 grams; talc, 200, violet-root powder, 200; rice meal, 500; extrait de Jasmin 15; bergamot oil, 0·5; rose oil, 0·59; ylang-ylang oil, 1;

musk tincture, 5 (the latter prepared from musk, 20 grams; rose water, 250 grams; alcohol, 2 litres).

Rose powder.—Rice meal, 3 kilos; carmine, 4 grams, rose oil, 8 grams; santal, 8 grams.

White powder.—Rice meal, 2 kilos; bismuth white, 250 grams; citronella oil, 4 grams; bergamot oil, 4 grams; geranium oil, 2 grams.

Ordinary powder.—Rice meal, 2½ kilos; talc, 2½ kilos; magnesia, 80 grams; geranium oil, 13 grams.

Poudre de Riz.—Magnesia, 500 grams; talc, 4½ kilos, rice meal, 10 kilos; geranium oil, 200 grams; carmine, 20 grams; the whole scented with bergamot oil, 30 grams; ylang-ylang oil, 10 grams; neroli oil, 10 grams; and eau de Cologne, 200 grams.

A not unprofitable specialty, that can easily be produced as a subsidiary article on a small scale, is

### SOAP POWDER

The following method is perhaps the best, since no mill is required:—

| | | |
|---|---|---|
| 1. | Silver soap, or grain soft soap ... ... ... | 25 parts. |
| | Linseed oil soap ... ... ... | 20 ,, |
| | Calcined soda ... ... ... ... | 65-70 ,, |

crutched together, whereupon the mass becomes warm, it is then turned over with the shovel at short intervals, until it falls into small pieces. When quite cold it is passed through a fine sieve, and the powder is finished.

| | | |
|---|---|---|
| 2. | Olein ... ... ... ... ... | 35 parts. |
| | 40° Be. soda lye ... ... ... | 14 ,, |
| | Calcined soda ... ... ... ... | 7 ,, |
| | Water ... ... ... ... ... | 28 ,, |

The mixture is left to saponify, and forms a clear paste, which is boiled once. The fire is then drawn, and 35 parts of calcined soda are crutched in, until a granular mass is formed, and this is stirred till cold. If the powder is to be scented, or, as has latterly been practised, is to be endowed with an odour of ammonia or turpentine, the scent—generally essence of mirbane—or either ammonia or turpentine is added; when cold the product will be obtained in the state of a very solid mass, which has to be reduced to powder by grinding and sifting.

A cheaper powder can be prepared, in exactly the same way, from—

| | |
|---|---|
| Palm kernel oil ... ... ... ... | 13·5 parts. |
| Palm oil ... ... ... ... | 2 ,, |
| 40° Be. soda lye ... ... ... | 10 ,, |
| Water ... ... ... ... ... | 80 ,, |

to which are added 105 parts of calcined soda, for producing the paste.

A very profitable article, and one sure of a good sale, if only well advertised, is a

### WATER-SOFTENING PREPARATION,

composed of equal parts of anhydrous soda and slaked lime. For use, a small teaspoonful is added to 10 litres (2¼ galls.) of the water to be softened, and the whole left to settle a short time.

Although the ratio between the equivalent proportions of lime and soda is about as 1 : 2, trials made with this preparation show that, at the ordinary temperature, the water is obtained free from lime, the reaction proceeding slowly and there being always still a little soda present; but when used in the warm, the water always remains somewhat calcareous.

An article in considerable demand is

### SHAVING CREAM

Although soap creams have been on the market fo some years, complaints are constantly arising that th cream has a rancid smell and irritates the skin; but a length, after numerous attempts, a cream has been prepared free from these defects, and fulfilling all requirements. For the manufacture of this article a water bath is indispensable. The following ingredients are saponified in an enamelled pan, which is set in a larger vessel containing hot water:—Perfectly fresh lard, 15 kilos, and sesame oil, 3 kilos. The fat is raised to a temperature of 37°·5 C., and must be maintained thereat by suitably heating the water bath. Seven kilos of 40° Be. potash lye, 1½ kilos of 40° Be. soda lye, and ½ kilo of water are then weighed out separately, the soda lye being added first to the fat in a very thin stream, the potash afterwards, and both well stirred in until the mass is so thick that the stirrer will stand upright therein. This may take as much as a day to accomplish, but is the only way in which proper saponification can be secured. The cream must not be allowed to cool during the operation, but has to be kept warm by means of the water bath. The finished cream must be filled into stone jars and stored in a cellar. A fine, but expensive, perfume for this preparation consists of pure bitter-almond oil, 250 grams; pure Turkish-rose oil, 50 grams; cumarin, 2 grams. This scent must be added to the cold soap cream in a mortar shortly before sending out, or before use, and is incorporated by an industrious mixing and pounding.

A glycerin cold-cream soap is prepared as follows:—

Cocoanut oil, 30 kilos; tallow, 20 kilos; crude palm oil, 2 kilos, are warmed to 75° C., and into the mixture is stirred 30 kilos of 36° Be. soda lye, 2 kilos of glycerin, and ½ kilo of spermaceti (the latter warmed to the same temperature as the fat). The soap is then covered up and left to get hot spontaneously, which it will do in about an hour and a half. The product is a clear, solid, yellow soap, greatly resembling a settled curd soap. It is put into the frames, and scented with cassia oil, 50 grams; bergamot oil, 50; lavender oil, 120; musk tincture, 60; benzoin tincture, 80; oil of wintergreen, 20; clove oil, 80; and cinnamon oil, 10 grams.

### WASHING CREAMS

1. Prime white soft soap, 320 parts; pulverised olive-oil soap, 80; sesame oil, 20 parts, are well purified, and scented with 5 parts of oil of lemon rind.

2. Potash soft soap, 250 parts; best soda soap, 120; olive oil, 60; water, 60; potash, 7 parts.

3. Oil soap, 60 parts; dry soap powder, 30; honey, 15 parts; with sufficient rose water to produce a fine lathering cream.

4. Eight parts of lard and 2 of cocoanut oil are saponified with 4½ parts of 40° Be. potash lye on the water bath, coloured rose-red, and scented with rosewood oil and bergamot oil.

5. Thirty parts of best lard and 6 parts of sesame oil are melted, and into the mixture, at a temperature of 37°·5 C., is crutched a mixture of 3 parts of 40° Be. caustic-soda lye and 1 part of water, run in in a thin stream, this being followed in the same way by 14 parts of 40° Be. caustic-potash lye. The soap mass is maintained at the above temperature by the aid of a water bath, and is stirred until complete saponification is secured.

### HYGIENIC SOAP

is a specialty that should not be underestimated. The first preparation of this class to be mentioned is—

Marble-dust soap, which is prepared by liquefying household soap and mixing with a threefold volume of sifted marble dust. An addition of 4 per cent. of lysol is also recommended. Even without this addition, the soap in question fulfils its purpose of cleansing the hands by mechanical means, dispensing with the use of brushes, which are objectionable from a hygienic point of view.

Nicotine soap.—Mentzel of Bremen has prepared a nicotine soap for use in cases of skin diseases. It contains 10 per cent. of tobacco extract, which is equal to about 0·7 per cent. of nicotine. The use of this soap, which is brownish black in colour, and is scented with bergamot oil, is principally indicated in cases of parasitic skin diseases, especially those produced by animal parasites. Taenzer has successfully used nicotine soap, both in cases of scabies and several instances of pityriasis and parasitic eczema. It is unsuitable for moist eczemas and pustulous affections, but is recommended for the alleviation of itching. No unfavourable subsidiary action has been observed.

### SOAP ESSENCES

These are coloured or uncoloured scented alcoholic solutions of soap. The alcohol must be strong, otherwise the solutions will not be clear; 80 per cent. alcohol seems to be the best. Tallow and lard soaps are not suitable for the preparation of these articles, since they tend to remain opaque on cooling; and white olive-oil soaps are best for the purpose. Potash plays a favourable part in the production of these essences; nevertheless an excess of the alkali must be carefully avoided. The most usual formula is—White olive-oil soap, 200 parts; 80 per cent. alcohol, 1000 parts; pure potassium carbonate, 12 parts. The soap is cut into small strips, and introduced into a closed vessel, placed in a water bath. The alcohol and potash are then added, and the bath is slowly heated, stirring being practised without interruption. When complete solution has been effected—in about forty-five to sixty minutes—the vessel is removed from the water bath, and the scent is added. The soap may be coloured yellow or red, by saffron or rosaniline respectively, and is then left to settle, being afterwards decanted, or preferably filtered with care. Rabiquet recommends the following recipe:—White soap, 1 part; 85 per cent. alcohol, 3 parts; distilled water, 1 part. A special detergent preparation may be obtained by mixing—White soap, 2 parts; 80 per cent. alcohol, 4 parts; soda crystals, 1 part.

SMELLING BOTTLES

English smelling salts are prepared by mixing 2 parts of coarsely powdered sal-ammoniac with 1 part of pure potassium carbonate in a mortar or on paper, the smelling bottle being nearly filled with this mixture, which is covered by a plug of cotton-wool or asbestos. A little scent, according to the taste of the purchaser, is dropped on this, and the bottle is closed with a stopper.

French smelling salts.—The stoppered smelling bottle is half-filled with strong, suitably scented glacial acetic acid, and sufficient loose asbestos, or glass wool, is added to prevent the contents running out when the bottle is reversed. The scent used may be lavender oil, bergamot oil, cinnamon oil, clove oil, or thymol and eucalyptol.

Spray perfume, for spraying in the air of rooms, is prepared from the subjoined recipe:—

Five kilos of 92 per cent. alcohol, 4 kilos of warm water, 1 kilo of eau de Cologne, 1·3 kilos of jasmine extract, 700 grams of rose extract, 300 grams of acacia extract, 750 grams of violet-root tincture, 1 gram of musk tincture, ½ gram of crystallised nerolin.

SPANISH LEATHER, AND SPANISH PASTE

The first of these articles is prepared by immersing a square strip of wash-leather for three to four days in a solution of:-Benzoin, 250 grams; bergamot oil, 20 grams; lemon oil, 20 grams; grass oil, 20 grams; lavender oil, 20 grams; nutmeg oil, 10 grams; clove oil, 10 grams; neroli oil, 40 grams; rose oil, 40 grams; santal oil, 40 grams; essence of Tonka bean, 20 grams; cinnamon oil, 10 grams; alcohol, 1 litre. The leather is then taken out, drained, spread out on a glass plate to dry, and afterwards coated on the rough side, by means of a brush, with a mixture prepared in a mortar, and consisting of sublimed benzoic acid, 10 grams; musk, 1 gram; civet, 1 gram; gum arabic, 30 grams; glycerin, 20 grams; and water, 50 grams. The piece is next folded across the middle, smoothed down with a paper knife, and left to dry under slight pressure. When dry, it will give off an exceedingly fine perfume for a period of years; it is usually enclosed in a strong silk case. Instead of leather, four to six layers of blotting paper may be treated in the same manner and enclosed in a cover; and thin layers of cotton wadding, laid between two sheets of paper, may also be scented in the same manner.

To prepare Spanish paste, the following ingredients may be intimately mixed in a mortar, sufficient water being then added, drop by drop, to form a plastic paste:—Ambergris, 20 grams; benzoin, 40 grams; musk, 20 grams; vanilla, 20 grams; violet root, 20 grams; cinnamon, 20 grams; bergamot oil, 40 grams; rose oil, 30 grams; gum arabic, 40 grams; and glycerin, 40 grams. This paste is divided into lumps about the size of hazel nuts, and packed in scent boxes or cassolettes.

For removing the disagreeable stains produced by silver nitrate, the only effective reagent is potassium cyanide. This is poisonous, and therefore must be used with great care; it is, however, possible to mix this cyanide with soap, the diluted preparation being then known as

### PHOTOGRAPHERS' SOAP

When applied to the stained surface, this preparation will quickly, though not instantaneously, remove the colour. On account of its unstable character, potassium cyanide cannot be added to soap in a hot liquid state, but must be incorporated with the same in the following manner:—Good curd soap is cut into fine shavings, allowed to dry slowly, and then reduced to powder, the latter being afterwards mixed with 10-20 per cent. of potassium cyanide in a finely divided condition. To ensure uniformity of mixing, the mixed powder should be run twice through the soap mill; which done, the percentage of cyanide in the soap can be guaranteed. The mixing should be effected very quickly, and at the lowest possible temperature, since the cyanide is readily decomposed by warmth and moisture, and loses its efficacy.

For sale, this soap should be packed in tinfoil, either as it is or after conversion into milled soap.

Another way of preparing photographers' soap is by incorporating the above proportions of potassium cyanide with a carefully prepared soft soap, by stirring. This product should be packed in good tins for sale.

## SCENT CAKES

These preparations of scent in the solid form are made of the ingredients given below, mixed with melted paraffin wax at the lowest possible temperature. The melted mass is then cast into circular moulds,—such as the lids of small tin boxes,—from which it is removed when cold and wrapped in tinfoil.

White rose.—Geranium oil, 20; bergamot oil, 20; patchouli oil, 3.

Lavender.—Mitcham lavender oil, 1000; bergamot oil, 500; cinnamon oil, 6; geranium oil, 50; neroli oil, 6.

Ess Bouquet.—Bergamot oil, 600; lavender oil, 200; clove oil, 140; nutmeg oil, 70; coriander oil, 20; santal-wood oil, 70; rose oil, 40; geranium oil, 50; orange oil, 12.

## SPECIALTIES FOR THE TEETH

Odontine.—This preparation may be recommended as a specialty for cleaning the teeth, 10-20 drops being poured on to a tooth brush, previously moistened with water. It is an agreeable and elegant preparation, which is easily introduced, and forms a very saleable article. The method of preparing it is as follows:—

125 grams of Quillaya bark and 3½ grams of persio are digested for several days in a close vessel with a mixture of equal volumes of water and alcohol. To this liquid,

measuring about 1 litre, is added a mixture of—Heliotropin, 0·13 gram; peppermint oil, 20 drops; and oil of aniseed, 10 drops, dissolved in 30 c.c. of alcohol. After standing several days in a filled, stoppered bottle, set in a moderately warm place, the solution is filtered if necessary, mixed with 500 grams of glycerin, and filled into bottles holding 2-3 oz.

Another method: 90 grams of powdered myrrh are extracted with a mixture of 720 grams of alcohol and 240 grams of water. At the same time, 45 grams of Spanish soap, cut into shavings, are dissolved in a mixture of 720 grams of alcohol and 240 grams of water. Both are filtered, mixed together, coloured wine-red with alkanna root or alkannin, scented with a mixture of—Lemon oil, 30 drops; peppermint oil, 30; oil of wintergreen, 10; sternanis oil, 30 drops; and, finally, 120 grams of glycerin are added. After standing one or two weeks in a cool place, the liquid is filtered and filled into bottles, after having received an addition of 18 grams of acetic ether.

Still other methods are the following:—

1. Sixteen parts of talc, 8 parts each of medicinal soap and white sugar, 1 part each of gum arabic and Berlin red, 1 part of peppermint oil, 4 parts of glycerin, and 4 parts of distilled water, are mixed to a homogeneous paste.

2. Prepared oyster shells, 96 parts; powdered pumice, 4; violet root, 12; Venetian soap, 20; and Berlin red, 12 parts, are mixed, triturated with 8 parts each of white syrup and glycerin, 1 part of peppermint oil, and $\frac{1}{16}$ part of olive oil; then made up to a uniform paste with 10-12 parts each of alcohol and distilled water.

Owing to the presence of pumice, and consequent attritive action on the teeth, the last recipe cannot be specially recommended. Probably, also, the oyster shells mentioned could be advantageously replaced by precipitated chalk.

Kalodont, a highly popular preparation for cleansing the teeth, is packed in tubes, and can be successfully imitated by means of the following recipe:—Equal parts of soap powder from good neutral soap, finest levigated chalk, and 28° Be. glycerin are carefully mixed, and incorporated with sufficient water to form a thin pulp. This is coloured with soluble soap, red or carmine solution, scented with peppermint oil, warmed and stirred in a porcelain dish over the water bath, re-cooled, and filled into tubes whilst still semi-fluid.

Eau de Botot, which is also popular, is prepared in different ways, the best being the English and French recipes. Ratanhia root, from *Krameria triandra*, a plant indigenous to South America, is frequently used, and furnishes a red-coloured alcoholic extract.

The English recipe runs as follows:—Cedar essence, 4 litres; myrrh essence, 1 litre; ratanhia essence, 1 litre; lavender oil, 20 grams; peppermint oil, 30 grams; rose oil, 10 grams.

French recipe:—Anise, 280 grams; cochineal, 20 grams; mace; 10 grams; clove, 10 grams; cinnamon, 80 grams; alcohol, 3 litres; peppermint oil, 20 grams.

The following recipe, though more complicated, yields a very fine product:—Lemon rind, 100 grams; cloves, 100 grams; horse radish, 100 grams; rose leaves, 100 grams; and soap powder, 100 grams, are finely ground or pounded, suffused with 8 litres of alcohol, and then distilled. In about three weeks the preparation is scented with 25 grams of cassia oil and 160 of peppermint oil, and filled into bottles.

### CARBOLIC POWDER AND SALICYLIC POWDER

are in plentiful demand, especially in the summer months, and form very profitable articles.

Carbolic powder is prepared by melting 60 parts of resin and 70 of stearin by gentle heat, and to the cooled but still fluid mixture are added 25 parts of carbolic acid, the whole being then converted into a uniform powder by careful trituration with 700-800 parts of levigated chalk. The powder is packed in a dredger (which can be kept closed when not in use), and is applied by dusting.

Salicylic powder.—Pure starch powder is added by degrees, with continued stirring, to a 2·3 per cent. alcoholic solution of salicylic acid, the volume of this solution being such that it extends a hand's-breadth above the starch when the latter has settled down. This being accomplished, the alcoholic liquid is poured off, the residue pressed in a close muslin cloth, dried, triturated, and dried again at a temperature of 80° C. The objection that the incorporation of the salicylic acid and starch could be as completely effected by dry mixing, is disproved by examining the mixture under the microscope, which will show that, in the case of a starch containing 2 per cent. of dry salicylic acid, as many as five, six, or even more starch granules can be counted in some parts before one fragment of the acid crystals is seen; whereas, with the method described above, each grain of starch will be found embedded in a rudimentary micro-crystal of the acid.

### SALICYLATED TALLOW

is prepared by dissolving 2 parts of salicylic acid in 5 of benzoin tincture, and adding the solution to a melted digest of 100 parts of mutton tallow with 5 of gum benzoin, the whole being stirred a few times, and packed into suitable tins.

It is advisable to employ benzoated tallow, since this has a more agreeable odour, and keeps the preparation from becoming rancid, at least for a long time. To save the expense of the tins, the article may be made up in stick form. For this purpose, 100 parts of benzoated tallow are melted with 50 of olive oil and 50 of yellow wax, the melt then receiving an addition of 4 parts of salicylic acid, previously dissolved in 10 parts of tincture of benzoin, and the whole finally poured into the same moulds as are usually employed for stick pomades. The sticks are cut into proper lengths, wrapped in tinfoil, and labelled.

### STICK POMADES

Special preparations are frequently employed to keep the hair in place; and a suitable article for this purpose can be obtained from the following recipe:—

| | |
|---|---|
| Olive oil ... ... ... ... | 90 grams. |
| Yellow wax ... ... ... ... | 70 ,, |
| Spermaceti ... ... ... ... | 10 ,, |
| Bergamot oil ... ... ... ... | 2 ,, |
| Melissa oil ... ... ... ... | 0·8 ,, |

The odour of this pomade recalls that of honey; but, of course, it can be scented in any desired manner, *e.g.* with geranium oil and a little cumarin.

In preparing stick pomade with petroleum jelly, the basis consists of a mixture of—Ceresin, 100 parts; petroleum jelly, 200 parts—white petroleum jelly for white pomade, and yellow petroleum jelly for yellow or coloured preparations;—tallow 100 parts; and lard, 50 parts. These materials are melted in the order given, the mass being coloured as required—rose-red with alkannin, brown with umber, black with vine black. When cool enough to be poured into the moulds, it is scented with 6-7 parts of any desired perfume, *e.g.* a mixture of bergamot oil, 2½ parts; petit-grain oil, 2½; lavender oil, 1; and clove oil, 1 part.

### MENTHOL PREPARATIONS

The menthol preparations are well adapted for the production of specialties. Menthol is the name applied to the stearoptene isolated from the ethereal oils obtained from various species of mint, of Japanese, Chinese, and North American origin. This product forms white crystalline masses, with a peculiar smell and taste of peppermint, though that from Chinese oil has a bitter flavour, and smells more like spearmint. It is sparingly soluble in water, but more readily so in alcohol, ether, oil, and chloroform. Pure menthol melts at 43° C. and boils at 212° C.

Since menthol now enjoys extensive use, a few recipes of practical value are subjoined.

### MENTHOL MIGRAINE OINTMENT

Two parts of white petroleum jelly and 85 of lanolin are united in a porcelain basin over the water bath, and to the mixture is slowly added, with stirring, 10 parts of menthol, the liquid being poured off as soon as the mass begins to thicken.

### CHLORAL MENTHOL

This is a mixture of chloral and menthol in equal parts, warmed together on the water bath to a temperature not exceeding 30° C. The resulting thick oily liquid has proved efficacious in facial neuralgia and toothache.

### MENTHOLINE, INSTANTANEOUS

Ten parts of menthol are dissolved in 78 parts of 95 per cent. alcohol, and mixed with 12 parts of strong ammonia. This liniment acts very rapidly in the case of sprains, local smarting, etc.

### MENTHOL VINEGAR

Three parts of menthol and 97 of white vinegar. When largely diluted with rose water, it may be used as a washing fluid.

### MENTHOL TOOTHACHE DROPS

Menthol, 8 parts; chloroform, 8; and 95 per cent. alcohol, 84 parts, mixed together as intimately as possible. In cases of toothache resulting from caries, a little cotton-wool is steeped in the preparation and inserted in the hollow of the tooth.

### MENTHOL ICE

Ten parts of spermaceti are melted with an equal quantity of white petroleum jelly in a porcelain dish on the water bath, and 10 parts of menthol are added to the mixture.

### MENTHOL SNUFF FOR CATARRH

Menthol, 15 parts; boric acid, 30 parts; and ammonium chloride, 55 parts, are triturated and intimately mixed together in a porcelain mortar.

### MENTHOL CREAM

Menthol cream, frequently used by barbers for cooling the face after shaving, is prepared from—Tragacanth, 1 part; glycerin, 3; alcohol, 4; menthol, 4; water, *quant. suf.* The tragacanth is first suffused with warm water, and left for two to three days with frequent shaking, the glycerin being then added, followed by the menthol dissolved in alcohol.

### SOZODONT

is prepared from—White Castile soap, 4 grams; glycerin, 4; water, 1; alcohol, 2 grams; peppermint oil, 5 drops; wintergreen oil, 12 drops. Cochineal is used to impart a red colour.

### SAND-ALMOND BRAN,

is a very popular toilet preparation, compounded by dissolving 4 parts of borax in 8 of glycerin, the solution being used for impregnating 30 parts of extremely finely powdered sand. The mixture is gradually incorporated with 80 parts of almond bran, and scented with a little oil of bitter almonds.

### ALMOND BRAN

is prepared, for cosmetic purposes, in the following manner:—Calcined soda, 50 grams; powdered borax, 100; finest violet-root powder, 250; and finest wheat flour or rice meal, 2000, are mixed together, 120 grams of fatty oil of almonds being then uniformly incorporated therewith. Finally, 100 grams of alcohol and about 50 drops of oil of bitter almonds are added, and the whole is rubbed through a medium hair sieve.

### SCENTED PARAFFIN TABLETS

can also be recommended as cosmetic specialties in the wider sense of the term. Paraffin is melted on the water bath and mixed with any desired proportion of scent, the whole being then cast into moulds, and the tablets employed for rubbing the handkerchief or clothing.

Suitable recipes herefor are—To 125 grams of paraffin: essence of lavender, 7 grams; essence of cloves, 3; essence of geranium, 1; essence of bergamot, 7; vanillin, ½; glycerin, 3 grams. To 250 grams of paraffin: neroli essence, 3 grams; essence of geranium, 3; essence of lavender, 3; essence of bergamot, 7; essence of cloves, ½; heliotropin, 1; glycerin, 3 grams. To 125 grams of paraffin: essence of ylang-ylang, 7; cumarin, 1; essence of musk, 1; essence of cloves, 3; santal-wood essence, 2; glycerin, 3 grams.

### MASSAGE COSMETIC

This is a new specialty, which is largely used in America before, during, and after massage. The preparation known as "Madame Dornier's Cosmetic," which is claimed to be an excellent softener for the hands, is compounded as follows:—

| | |
|---|---|
| Alum ... ... ... .. ... | 4 parts. |
| Oak bark ... ... ... ... | 4 ,, |
| Aniseed ... ... ... ... | 8 ,, |
| Thyme... ... ... ... ... | 8 ,, |

| | | |
|---|---|---|
| Sage | 8 | ,, |
| Rosemary | 8 | ,, |
| Hyssop | 8 | ,, |
| Lavender flowers | 8 | ,, |
| Wormwood | 8 | ,, |
| Camphor | 8 | ,, |
| Peppermint | 8 | ,, |
| 45 per cent. alcohol | 1000 | ,, |

The ingredients are macerated for fifteen days and then filtered. It would be advisable, perhaps, to strain the mixture, then add the alum, and filter after settling.

OF INDUSTRIES

# CHAPTER IX

## ANTISEPTIC WASHES AND SOAPS, TOILET AND HYGIENIC SOAPS

THE cosmetic preparations employed for treating the hair, and which are not infrequently prepared by members of the laity, do not, for the most part, reach that state of perfection that might be expected from the present development of chemistry and physiology; and, in fact, we still find in this branch a number of useless, unsuitable, and even injurious preparations. Nevertheless, large sums are laid out annually on useless preparations claiming to promote the growth of the hair on hairless parts of the cuticle. A preparation of this kind (for forcing the beard) was investigated by Simon, and was found to possess the interesting property of causing intense itching and smarting on the first application, and in one case produced great swelling of the face and frightful smarting, these effects being readily explained by the fact that the preparation proved to be a 5 per cent. solution of cantharides.

Again, washes for the hair and head only too frequently contain ingredients that redden the skin, such as cantharides tincture, mustard tincture, tincture of Spanish pepper or onions, oil of mustard, formic acid, and the like, the use of which cannot be recommended, since none of them is capable of stimulating the growth of the hair, even when constantly applied. In fact, any good

results following their use could be equally attained by means of any other hair wash, especially those of an antiseptic character, and are in reality merely the consequence of the increased attention bestowed on the general care of the hair, more particularly as regards washing the head. On the other hand, the continued use of such concentrated preparations of the ingredients referred to, is by no means free from danger. Simon found, in several instances, in the case of an eau de Quinquine prepared with tincture of cantharides, a short continued use produced itching and smarting of the scalp, and even a rush of blood to the head, with the usual consequences. Hence such materials should only be used under the directions of an experienced medical man, and do not belong to the domain of cosmetics at all.

It is well known that the falling out of the hair is due for the most part to the action of small vegetable parasites, which find their way into and destroy the hair, mostly as the result of continued uncleanliness,—especially defective attention,—though in some cases by direct contagion. The hair may also fall out in consequences of general disturbances of nutrition, consumption, loss of power, and illnesses of all kinds, especially nervous complaints and skin diseases; as also by defective ventilation of the scalp, or insufficient nutrition of the same, by constantly wearing head coverings that are either impermeable, too heavy, or too tight, such as waterproof hats and caps, helmets, etc.

Now, whilst in the case of hair falling out as the result of illness, the only way to ensure the success of remedies is to improve simultaneously the general strength of the entire organism, a similar occurrence caused by parasites or defective care of the hair can be arrested by the aid of suitable cosmetic preparations; this also applies to cases resulting from the use of unsuitable head coverings, provided the cause be removed at the same time.

In the first place, it will be necessary briefly to con-

sider the proper care of the hair in health, since on this point there are current a variety of opinions, chiefly based on habit and training; since, whilst an uneducated individual cares little for cleansing the hair, and looks mainly to pomade, those who are better informed attach the greatest importance to cleanliness, attained by frequent washing. Certainly, the latter is the more correct view, though the moderate use of suitable pomades has its justification. Fat imparts gloss, smoothness, and softness to the hair, and diminishes the evaporation of moisture from the hair and scalp. Hair that is insufficiently greased, suffers considerably from excessive evaporation, which is intensified by perspiration and heat, and thereby loses its gloss, smoothness, and softness, becoming hard and even brittle. If, therefore, the natural fat of the hair is insufficient to keep it glossy and smooth, it must be supplemented by frequent small additions of fat, and this should always be done whenever the hair is washed.

The extremely large surface presented to the atmosphere by the hair renders the latter highly susceptible to the influence of the former. The fat suffers oxidation, and, unless prevented by careful attention, quickly unites with the ever-present dust to form an impermeable incrustation. When insufficient attention is bestowed on the hair, an increased secretion of the natural fat occurs, and this is just as frequent a source of scurf as excessive pomading. On the other hand, if the hair receive proper attention, especially as regards frequent washing, this scurf will not appear; and it is the recognition of this fact that has led to the introduction of the large number of hair washes and the like now in use. As a matter of fact, also, a good hair wash is really useful for the purpose in question.

A good hair wash should free the hair from grease, help to remove dirt and dust, be convenient to use, and exhibit a pleasant odour. It therefore follows that such

results following their use could be equally attained by means of any other hair wash, especially those of an antiseptic character, and are in reality merely the consequence of the increased attention bestowed on the general care of the hair, more particularly as regards washing the head. On the other hand, the continued use of such concentrated preparations of the ingredients referred to, is by no means free from danger. Simon found, in several instances, in the case of an eau de Quinquine prepared with tincture of cantharides, a short continued use produced itching and smarting of the scalp, and even a rush of blood to the head, with the usual consequences. Hence such materials should only be used under the directions of an experienced medical man, and do not belong to the domain of cosmetics at all.

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or similar scent, 75. The method of preparation is the same as for the Rosemary Wash.

Soap hair washes.—(1) Soap spirit, 200; glycerin, 100; scent, 75; eau de Cologne, Bouquet d'Amour, eau de Millefleurs, 90 per cent. spirit, 325; water, 300 parts.

(2) Medicinal soap or white cocoanut-oil soap, 25 grams; ammonia, 10; rose water, 800; glycerin, 100; 90 per cent. spirit, 100; geranium oil, 2; bergamot oil, 1 gram; oil of bitter almonds, 2 drops.

The best and most agreeable of the above washes are the Quillaya wash and the soap washes. American shampoo fluid, which is prepared with eggs, will only keep a very short time. The last of the above soap washes is exceedingly cheap, highly agreeable, and fully equal to the American preparation.

Athenian hair wash.—Potassium carbonate, 70 grams; sassafras wood, 250 grams; rose water, 4 litres; orange-flower water, 4 litres; alcohol, 1 litre.

The ingredients are digested together for a month. The potassium carbonate and the alcohol have a cleansing effect on the hair. After using this wash, the hair, when dry, should be treated with a fine pomade or hair oil, in order to restore fat and gloss.

Glycerin and Cantharides wash.—Ammonia, 100 grams; essence of cantharides, 100 grams; rosemary water, 8 litres; glycerin, 300 grams; rose oil, 20 grams. The cantharides essence is prepared by digesting 50 grams of powdered Spanish fly with 1 litre of strong alcohol. The ammonia acts like potassium carbonate, as a detergent; the glycerin imparts softness and suppleness to the hair.

Blossom hair wash.—Acacia essence, 200 grams; jasmine essence, 200; orange-flower essence, 290; Tonka-bean essence, 100; tuberose essence, 200; vanilla essence, 100 grams; rose water, 2 litres; alcohol, 2 litres.

Soap hair wash.—Rosemary water, 5 litres; rondeletia perfume, 300 grams; saffron, 5; soap, 30; alcohol, 300 grams.

results following their use could be equally attained by means of any other hair wash, especially those of an antiseptic character, and are in reality merely the consequence of the increased attention bestowed on the general care of the hair, more particularly as regards washing the head. On the other hand, the continued use of such concentrated preparations of the ingredients referred to, is by no means free from danger. Simon found, in several instances, in the case of an eau de Quinquine prepared with tincture of cantharides, a short continued use produced itching and smarting of the scalp, and even a rush of blood to the head, with the usual consequences. Hence such materials should only be used under the directions of an experienced medical man, and do not belong to the domain of cosmetics at all.

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thymol, 30 grams; or eucalyptol, 40 grams; or 30 grams of benzoic acid from toluol, and 15 grams of thymol.

The perfume may be either—½ gram wintergreen oil, 0·1 gram geranium oil, and 0·1 gram orange-flower oil; or 1 gram cumarin sugar (1 : 1000), 4 drops rose oil, 4 drops bergamot oil, 2 drops French geranium oil, 2 drops ethereal oil of bitter almonds; or 1·0 gram cumarin sugar, 2·5 grams peppermint oil, 1·09 gram clove oil, 0·5 gram wintergreen oil; or, especially for thymol washes, 8 grams peppermint oil, 2½ grams clove oil, 1 gram sassafras oil, and 10 grams cumarin sugar.

The antiseptic hair washes combine the properties of the previous hair waters with those of the true hair washes. They are applied in an undiluted condition, and, in addition to cleansing, disinfect the hair and scalp They may be recommended, not merely as washes, but also as medicaments against scurf, parasitical diseases of the hair, etc., and form the most suitable preparations for use by the laity.

A trustworthy recipe for a wash of this kind is the following:—

Borax, 25 grams; pure potash soap from olein or olive oil, 40 grams; glycerin, 100 grams; rose water, 650 grams; spirit, 250 grams; crystallised phenol, creolin, solveol, or similar cresols, 15 grams. The soap is dissolved in water, the glycerin and borax being then added, followed by the antiseptic and scent dissolved in the spirit, the whole being then set in the cool for a day, and finally decanted.

Mention might be made of a number of hair waters, for which stimulative action on the growth of the hair is claimed on account of the presence of quinine or similar alkaloids, Peruvian balsam, or tannin. Peruvian balsam is the most promising, but exerts its favourable effects only when added to pomades, and cannot be recommended for hair waters. Tannin substances in general retard the growth of the hair, and their sole recom-

results following their use could be equally attained by means of any other hair wash, especially those of an antiseptic character, and are in reality merely the consequence of the increased attention bestowed on the general care of the hair, more particularly as regards washing the head. On the other hand, the continued use of such concentrated preparations of the ingredients referred to, is by no means free from danger. Simon found, in several instances, in the case of an eau de Quinquine prepared with tincture of cantharides, a short continued use produced itching and smarting of the scalp, and even a rush of blood to the head, with the usual consequences. Hence such materials should only be used under the directions of an experienced medical man, and do not belong to the domain of cosmetics at all.

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### BAUME DE MILAN POUR LES CHEVEUX

| | | |
|---|---|---|
| Lard ... | 500 | grams. |
| Almond oil | 500 | ,, |
| Spermaceti | 50 | ,, |
| Carmine | 10 | ,, |
| Styrax essence ... | 30 | ,, |
| Cantharides tincture | 20 | ,, |
| Tolu essence | 30 | ,, |

### BEARD FORCING LOTION

| | | |
|---|---|---|
| Lard ... | 500 | grams. |
| Almond oil | 500 | ,, |
| Spermaceti | 20 | ,, |
| Cantharides | 20 | ,, |
| Carmine | 10 | ,, |
| Bergamot oil | 5 | ,, |
| Lavender oil | 5 | ,, |
| Santal oil | 5 | ,, |

The cantharides are first triturated to a fine powder along with the carmine, the product being incorporated with the ethereal oils, and finally with the other ingredients.

Antiseptic scurf water.—Five parts of tannic acid are stirred up with 20 parts of formaldehyde, and treated with 5 parts of sulphuric acid. The reddish mass is placed in water, filtered, and washed until the washings cease to show any trace of acid, whereupon the residue is dried by gentle heat. Five parts of this product are dissolved in 100 parts of spirit, and furnish a liquid equal to eau de Quinine de Pinaud, and only requiring to be scented. The red colour is fast to light, but does not dye the scalp, nor does the colour come off.

### ANTISEPTIC SOAPS: THEIR PREPARATION AND APPLICATION IN COSMETICS

Generally speaking, the action of soaps is of a cleansing character; but by suitable adjuncts they may require new and valuable disinfectant properties.

In order to ascertain on what the cleansing power of soap is based, Rotondi precipitated a solution of Marseilles (olive oil) soap with salt, dissolved the precipitate in 95 per cent. alcohol, filtered the solution, evaporated the solvent from the filtrate, and repeated the operation, thus producing a pure soap which was completely soluble in boiling water, and had an alkaline reaction towards litmus, without, however, containing any alkali hydroxide or carbonate. The soap gave, on analysis, the following composition:—

| | Air dry. | Dried over Sulphuric Acid. |
|---|---|---|
| Water ... ... ... ... | 29·41 | |
| Fatty acids (m.p. 41° 5 C.) ... | 64·90 | 91·43 |
| Sodium Oxide ... ... ... | 7·82 | 11·82 |
| Inorganic salts ... ... .... | 0·16 | 0·31 |

From this soap Rotondi prepared solutions of different strength, and subjected the same dialysis in the following manner:—(1) 100 grams of the soap were reduced to the smallest possible fragments, and then dialysed for thirty days at 15° C. (2) 100 grams of soap were dissolved in two litres of water, and treated as before. (3) 100 grams of the soap were dissolved in 2 litres of boiling water and dialysed for thirty days at 15° C. (4) 100 grams of the soap were dissolved in ½ litre of distilled water and dialysed at a temperature of 80° C. At the end of the experiment the various dialysed and undialysed liquids were evaporated on the water bath, the residues, after drying over sulphuric acid, giving the following results:—

| | Percentage of Sodium Oxide in the Residue from the | |
|---|---|---|
| | Dialysed Liquids. | Undialysed. |
| Experiment 1, ... ... | 15·06 | 10·81 |
| ,, 2, ... ... | 15·34 | 10·74 |
| ,, 3, ... ... | 16·12 | 9·56 |
| ,, 4, ... ... | 15·58 | 9·83 |

In the first and second experiments, particularly, the proportion of dialysed to undialysed soap was very small.

The evaporation residues from the dialysed liquids are soluble in water, and the solutions do not become turbid unless exposed to the air for several days. On the other hand, those from the undialysed liquids are soluble in hot water alone, and immediately become turbid on cooling. If the dialysis be sufficiently prolonged, the residue finally obtained is undialysable, and is also insoluble in hot water. Since the dialysed liquids contain no free alkali, Rotondi draws the following conclusions from his experiments:—1. The neutral soaps on a basis of alkali are decomposed by water into basic soaps, soluble in hot and cold water, and into acid soaps insoluble in cold water and only sparingly soluble in hot water. 2. The decomposition of the neutral soap is effected more easily in hot water than in cold, and the rapidity varies according to the concentration and temperature of the solution. 3. The basic soaps dialyse easily; not so the acid soaps. 4. The solution of basic soap obtained by dialysis may still contain neutral soaps, which can again be decomposed into acid and basic soaps, until, finally, the solution contains basic soap only. 5. Neither alkali hydrate nor alkali carbonate is liberated during the decomposition of the neutral soaps by water, as may be easily ascertained by precipitating the basic soap by common salt and dialysing the liquid after filtration.

The action of water on soap can also be demonstrated without dialysis. With this object Rotondi prepared a solution of 100 grams of soap in 1 litre of water by warming, and left the solution to stand twenty-four hours in an open vessel.

He then succeeded, by filtration, in separating an insoluble soap A, and a liquid soap B. The soap A, dried over sulphuric acid, gave a residue containing 10·17 per cent. of sodium oxide. This residue was completely soluble in boiling water; but, on cooling and filtering the solution, an insoluble soap, containing 6·11 per cent. of sodium oxide, was obtained. On evaporation, the solution

It left a residue containing 14·12 per cent. of sodium oxide. On being left to stand in an open vessel for fourteen days, it deposited a fibrous substance, which, when separated by filtration and dried over sulphuric acid, contained 7·84 per cent. of sodium oxide. The filtrate gave, on evaporation, a residue containing 15·97 per cent. On being left to stand fourteen days longer in an open vessel, it gave a further insoluble deposit; but nothing further could be brought to deposit from the filtered residual liquid. The residue, on evaporation, however, contained 16·21 per cent. of sodium oxide. This residue proved completely insoluble in cold water, gave a strongly alkaline reaction, was completely precipitable by common salt, and the liquid filtered from the precipitate contained no alkali hydrate or alkali carbonate.

It follows from these experiments that the neutral soaps are decomposed by water into acid and basic soaps; that the basic soaps are completely soluble in cold water; whereas the acid soaps are only very sparingly soluble, even in hot water; and that the basic soaps are completely precipitated by common salt, without any liberation of free alkali. The aqueous solution of the basic soaps gives —especially when hot—a clear liquid with oleic acid and other fatty acids, this liquid also remaining clear on cooling, provided a sufficient quantity of basic soap be present. If, however, the solution be exposed to the air for several days, it becomes turbid, owing to the separation of the mixture of basic and neutral soaps into acid and basic soaps. The basic soaps dissolve the acid soaps in the warm; but the solution becomes turbid on cooling, after a longer or a shorter time, according to the proportions of basic and acid soap present. This explains why ordinary soaps are soluble in hot water, although the decomposition is more complete therein than in cold water. The cold aqueous solutions of the basic soaps do not combine with fats, but merely form emulsions. In this manner one can obtain with triolein a mass resembling clotted cream, and keeping for several months without any separation of oil globules. The mass is also unaltered by warming; but when treated with an addition of 80 per cent. alcohol, the fat is separated, and floats above a clear liquid, containing no glycerin, a proof that the fat has not been saponified, but only emulsified.

This property is also possessed, though to a smaller extent, by the ordinary neutral soaps, especially in freshly prepared solutions, possibly because they are then more easily decomposed into basic and acid soaps than when older. That no saponification occurs, is evidenced by the fact that the fat can readily be separated by alcohol, and that no glycerin is to be found in the alcoholic solution. The acid soaps do not possess the property of emulsification, even in the warm, or if so, only to a very limited extent. If carbon dioxide be passed through a cold aqueous solution of basic soap, a milky liquid results, which, however, can be reclarified by exposure to the air, by warming, or by the addition of alcohol, though it is difficult to obtain the solution clear by filtering. Common salt will precipitate all the soap dissolved or suspended therein. The residual liquid is free from alkali hydrate or alkali carbonate. The insolubility of basic soaps in water containing carbon dioxide explains the low cleansing power of basic and neutral soaps when used in highly carbonated waters—quite independent of the presence of inorganic salts in the waters.

Unna prepares his medicinal soaps in accordance with the following principle:—He employs only one fat, namely, best beef tallow, and rejects cocoanut oil entirely, on account of its roughening effect on the skin when continuously used. The alkali employed consists of a mixture of 2—in the middle of summer 3—parts of freshly prepared soda lye and 1 part of potash lye, the total quantity being just sufficient to leave the saponified mass perfectly neutral in reaction. These soda-potash soaps are solid. more efficacious than soaps from soda alone, and do not peel like the latter sometimes do. Since, when permanently incorporated with the skin, neutral soaps abstract fat therefrom, and produce a disagreeable brittleness, attended by congestion and roughness, Unna superfats his soaps, by taking, beyond the amount of fat necessary to complete saponification, an excess—averaging 3—4 per cent. of fats, consisting of 8 parts tallow and 1 part olive oil. These superfatted soaps have the additional advantage of better preserving sundry medicaments, such as acids—salicylic acid—and unstable salts—sublimate—better than ordinary neutral soaps do. Of course, all the other conditions applicable to the best toilet soaps must also be fulfilled; in particular, the under-lye precipitated by a minimum quantity of salt must be completely removed, and the soap must be dried as perfectly as possible. Unna rejects as useless any secondary addition of glycerin, petroleum jelly, or scent. The superfatted soda-potash soap he terms superfatted stock soap.

From this stock soap the medicinal soaps are prepared by grinding with weighed quantities of the medicaments employed, the mixture being first made with a small quantity of the stock soap, and the bulk of the latter is incorporated afterwards.

The application of these soaps may be of a threefold character. The least efficacious method is by washing in the ordinary manner, the soap being brought to a lather with warm water, rubbed into the skin, and then rinsed off again. The effect is far superior when the affected portions of the skin are lathered, and the soap rubbed off, at once or after a few minutes, with a dry cloth; but the best effect of all is produced by laying the soap lather on thick and allowing it to dry on. Hot or warm water is preferable to cold in using these soaps.

In order to prepare good lathering soaps by the warm process, Schneider recommends saponifying with a quantity of lye not quite sufficient to ensure complete saponification, the deficit being made good by an equivalent amount of soda solution afterwards.

In such cases where a decomposition of the soap is feared in this wet process, as may happen with salicylic acid,—which may give rise to the formation of an alkali silicate, fatty acid being then liberated,—Schneider recommends the following imitation of the milled-soap process:

The hardened outer portions of Venetian soap are pared off and the softer interior is rasped. A similar quantity of powdered medicinal soap—the exact amount depending on the percentage of moisture in the Venetian soap—is taken, and the medicaments to be used are mixed with this soap powder if they are in the solid form, but with the rasped Venetian soap when they are partly or entirely liquid. The two soaps are next mixed in a porcelain mortar, and put into tin, wooden, or cardboard moulds lined with tinfoil, the soap being pressed down firmly with the pestle. The moulded blocks are then wrapped in thin parchment paper, paraffin paper, or tinfoil.

A little steatite powder is generally added to medicinal soap by the makers, and this leaves the skin agreeably smooth after use.

Schneider's opinion, that the lathering qualities of boiled soap are improved by using an insufficient quality of lye at the outset, is controverted by the *Seifensieder Zeitung*, which states that an easier and better way, having the advantage of furnishing a properly saponified soap, is to employ an addition of cocoanut oil.

According to Boiry, cocoanut oil is peculiarly adapted for the preparation of medicinal soaps, and he recommends the following formula:—900 grams of cocoanut oil are boiled in a porcelain pan along with 600 grams of 10° Be. soda lye until the whole has assumed a creamy appearance, whereupon 375 grams of 20° Be. soda lye are added, and boiling is discontinued when a sample of the mass solidifies on being dropped on a cold plate. He then adds about 500 c.c. of distilled water, heats to boiling, and adds 375 grams of common salt; the soap rises to the surface of the liquid. After cooling, the soap is separated by decantation, from the layer of glycerin and brine, and is purified by a couple of washings with 20 per cent. brine, followed by a quick washing with cold distilled water, after which it is drained, and pressed to remove the excess of water. This process furnishes a pasty soap, which Boiry employs in the preparation of the following medicinal soaps: —

Borax soap.—900 grams of stock soap and 900 grams of sodium borate are triturated to a uniform mass, which is divided into portions of 100 grams each (or other suitable weight), and pressed into moulds.

Coal-tar soap.—100 grams of tar are gradually triturated with 900 grams of stock soap in a mortar. The same procedure is also recommended for naphthol soap.

Carbolic soap.—50 grams of white carbolic acid are dissolved in about 25 grams of 90 per cent. alcohol, and the solution gradually incorporated with 950 grams of stock soap by trituration.

Sublimate soap.—Five grams of corrosive sublimate are dissolved in 80 grams of alcohol, and the filtered solution incorporated with the soap as above.

Sulphur soap.—This is prepared from 100 grams of washed flowers of sulphur and 900 grams of soap, in the same manner as borax soap.

Antiseptic soaps frequently contain free alkali, which, in many cases, produces troublesome irritation of the skin. Attempts have therefore been made to obviate this defect by the addition of boric acid, basing the practice on the idea that an excess of boric acid will increase the antiseptic properties of the soap. A soap of this kind, containing 5 per cent. of boric acid, is now largely sold. It may, however, easily be shown that this soap by no means fulfils its object, the boric acid being combined with soda and not in the free state, the result being that a corresponding amount of fatty acid has been set at liberty.

Such superfatted soaps form inferior antiseptics; and far greater efficiency is secured by using a soap containing only a very small amount (about 1 per cent.) of boric acid in addition to the antiseptic ingredients. Such a soap is found, by bacteriological examination, to be highly efficacious.

Powdered medicinal soaps have been recommended by Eichoff as useful substitutes for the fatty medicinal soaps, the method of application being either by making them up into a paste with water, and using like ordinary soaps, or else to rub them into the skin with a woollen cloth. They are then allowed to dry on, or are covered over with some waterproof material. The stock soap consists of a neutral soap, dried and ground to powder. This is converted into a superfatted soap powder by an addition of 2 per cent. of oleic acid and 3 per cent. of lanolin; or into an alkaline powder by adding 2½ per cent. each of potassium and sodium carbonate. Eichoff recommends the following preparations:—

Salicylic acid soap powder, with 5 per cent. of salicylic acid; salicylic-resorcin soap powder, with 5 per cent. each of salicylic acid and resorcin; salicylic-sulphur soap powder, with 5 per cent. each of salicylic acid and sulphur; salicylic-resorcin-sulphur soap powder, with 5 per cent. each of all three adjuncts; sulphur soap powder, with 10 per cent. of sulphur; camphor-sulphur soap powder, with 2 per cent. of camphor and 5 per cent. of sulphur; Peruvian balsam soap powder, with 10 per cent. of Peruvian balsam; camphor-sulphur-Peruvian-balsam soap powder, with 2 per cent. of camphor, 5 per cent. of sulphur, and 10 per cent. of Peruvian balsam; naphthol-sulphur soap powder, with 5 per cent. each of B-naphthol and sulphur; naphthol soap powder, with 5 per cent. of B-naphthol; camphor soap powder, with 5 per cent. of camphor; borax soap powder, with 5 per cent. of borax; thymol soap powder, with 2 per cent. of thymol; benzoin soap powder, with 3 per cent. of benzoin; pumice soap powder, with

20 per cent. of pumice; chloride of lime soap powder, with 10 per cent. of bleaching powder; quinine soap powder, with 2 per cent. of sulphate of quinine; menthol soap powder, with 5 per cent. of menthol; salol soap powder, with 5 per cent. of salol; naphthalene soap powder, with 5 per cent. of naphthalene.

Liquid soaps, or soap essences, are coloured or uncoloured scented solutions of soap in alcohol.

The best stock for liquid soaps is Marseilles olive oil soap, which is completely soluble in hot 80 per cent. alcohol, though less perfectly so in cold alcohol. Soaps made from tallow and other solid fats, though also completely soluble in hot alcohol, are unsuitable for the preparation of liquid soaps, inasmuch as they become merely translucent on cooling. On the other hand, soaps from vegetable oils are very soluble in alcohol, and offer the advantage of furnishing solutions which remain liquid and clear for a very long time. The presence of potash plays a great part in the preparation of liquid soaps; nevertheless, an excess must be avoided, and 10—12 parts of pure potassium are sufficient to impart a slight alkaline reaction to 1000 parts of soap essence and increase its emulsive capacity.

The proportion of ingredients are as follows:—

White olive oil soap, 20 parts; 80 per cent. alcohol, 100 parts; pure potassium carbonate, 1—2 parts.

The soap is cut into small strips and placed in a roomy water bath, a closed vessel being necessary to prevent loss of alcohol. The potash and alcohol are then added, and the water bath is slowly heated, the soap being stirred to facilitate solution. When this is accomplished —forty to sixty minutes being required—the vessel is removed from the water bath, the scent and colouring matter—saffron or rosiniline—are added, and the soap is left for some hours to clarify, after which it is poured off, or, better, filtered. In consequence of its large alcohol content, the product remains liquid at the ordinary temperature, and suffers little alteration even by cold. The scent may be of different kinds: orange oil, lemon oil, or compound scents, like—oil of bitter almonds, 8 parts, and bergamot oil, 2 parts; or oil of bitter almonds, 5 parts; oil of mirbane, 2 parts; and oil of cinnamon, 1 part.

A very fine perfume is furnished by a mixture of—Vanilla tincture, 10 parts; violet-root extract, 20 parts; rose extract, 20 parts; orange-flower extract, 50 parts; white potash soap, 10 parts; potash, 1 part.

Robiquet recommends the following proportions in the preparation of liquid soap:—White soap, 1 part; 85 per cent. alcohol, 3 parts; distilled water, 1 part.

A composition of white soap, 2 parts: 80 per cent. alcohol, 4 parts; and soda crystals, 1 part, forms a good detergent; and Regnault gives the following recipe for a medicated soap that will lather freely:—White soap, 20 parts; distilled water, 30; 60 per cent. alcohol, 60; potash, 1 part; and scent, 8-10 per mil.

Saidemann gives the following recipe for his liquid soaps:—

One part of caustic potash is dissolved in an equal quantity of water and well shaken up for ten minutes with 4 parts of oil—olive oil or sesame oil—and ½ part of alcohol. After standing for an hour, with frequent shaking, the mixture is diluted with an equal volume of water, and left for several days before filtering. The soaps have the consistence of thick glycerin, contain an excess of fat, and show a content of up to 70 per cent. of water.

Liquid soaps appear to be specially commendable, since it is only when the soap is liquid that it can be well rubbed into the skin, and removed or left on according to convenience; moreover, because antiseptics are more easily incorporated with liquid soaps than with any others; and, finally, because these soaps must necessarily be prepared from vegetable oils, which are preferable to animal fats from a sanitary point of view, since these latter may have been derived from animals that have died.

Medicinal sulphur and tar-and-sulphur soaps are prepared by melting a suitable fat and saponifying it in a pan placed over an open fire and fitted with stirring appliances. Meanwhile 1 per cent. of sulphur is mixed to a soft paste with hot 25° Be. potash lye. The necessary amount of potash lye is run into the fat in a thin stream, followed by the sulphur paste and the scent, the whole being then stirred until the mass has become thick and viscous, whereupon it is transferred to the frames, which are covered up whilst still very warm, and left to stand. On the following day the frames are opened and the soap is cut. The addition of a little glycerin to the soap is advisable, as it increases the delicacy and suppleness of the product.

The same procedure is followed in the preparation of tar-and-sulphur soaps, except that the proportion of sulphur is somewhat diminished and a corresponding percentage of birch-tar oil is added to the soap when the mass commences to thicken, whereas the sulphur and the scent are added to the fat before the lye is run in. If the soap gives off much heat when framed, the frames should be left for about an hour before being covered up.

Medicinal sulphur-sand soap is prepared in the same manner as sulphur soap, except that an addition of 30 per cent. of sand or pumice is stirred into the soap in the pan. Cheap scents alone, *e.g.* oil of lavender, cinnamon, or clove, are used for this class of soap.

Thiosavonal is the name applied to sulphur soaps soluble in water. These are made from sulphonated oils, the following recipe being given by Grube:—

Sulphur soft soap.—The thick sulphonated oil is rendered more fluid by the aid of alcohol, and is gradually mixed, by continued stirring, with an equivalent quantity of potash lye, also diluted with alcohol; the addition of large quantities of lye at a time will cause a sudden deposition of sulphur, the risk of which, however, diminishes towards the end of saponification. Finally, a slight excess of potash lye is used; the complete saponification of the thio-fatty acids is indicated by the clearing of the liquid, and the fact that a sample will dissolve in water or alcohol to a clear solution. The excess of alkali is neutralised with an ethereal solution of fatty acid. The resulting soap solution is freed from alcohol in a steam bath, and, having been tested for neutrality, is evaporated to the consistence of ointment. Eighty-five parts of this soap are then mixed with 15 of glycerin; the water content of this mixture is about 12 per cent., and the percentage of the potassium compound of the thio-fatty acids is about 5 per cent.

Liquid sulphur soap.—The method of working is the same as above, except that the soap is only evaporated to the consistence of syrup. Eighty-eight parts of this liquid soap are mixed with 12 of glycerin, the mixture containing 29·6 per cent. of water and 4 per cent. of the potassium compounds of thio-fatty acids. Both varieties of thiosavonal are readily miscible with large amounts of tar, the more solid one requiring to be warmed first.

Schleich's marble soap is particularly suitable for disinfecting the hands. It is prepared according to the following recipes:—

| | |
|---|---|
| Clear, fresh, unfilled amber-yellow resin soap, cut into fine shavings ... ... ... | 750 grams |
| Warm water ... ... ... ... | 1500 ,, |

When this mixture has been completely dissolved by the aid of fire heat, there is added—

| | |
|---|---|
| Wax paste ... ... ... ... | 150 grams. |
| Stearin paste ... ... ... ... | 150 ,, |

and when these are dissolved, 7000 grams of coarse purified marble dust (No. 4 sieve) are stirred in by degrees. The product must be sterilised and concentrated to the consistence of syrup by heating for about an hour and a half, replacing the water lost by evaporation,—about 200 grams,—and stirring.

The wax paste is prepared by melting 100 grams of pure beeswax on the water bath, and by adding about 10 grams of ammonia, with stirring. About 160 grams of sterilised distilled water are then stirred in, until a homogeneous emulsion is produced.

The stearin paste is made by melting 100 grams of pure stearin in a basin, stirring in 8—10 grams of ammonia, diluting to a pulp with water, and a few more drops of water and ammonia are added at a time, until a snow-white emulsion, which must be alkaline, is formed.

Marble soap is a light yellow mass, with an agreeable odour recalling beeswax. The consistence is that of paste, and, when rubbed with water, it lathers freely and falls apart without assuming the sticky, stringy appearance of the potash (soft) soaps. Its use makes the hands very soft and delicate, and leaves an exceedingly agreeable feeling on the skin for some time.

### COSMETIC TOILET SOAPS AND HYGIENIC SOAPS

According to G. Hurst, the free alkali in soaps can be determined by dissolving 10 grams of soap in boiling water, and titrating the solution with normal sulphuric acid, in presence of phenolphthalein as indicator: a good hard soap should not consume more than 0·75—1·0 c.c. of the acid. The author, however, demonstrated the unsuitability of this method by showing that, even when 100 c.c. of each of the three solutions—1—10—of superfatted cocoanut-oil soap is treated with 2 c.c. of a 1 per cent. solution of phenolphthalein, a faint rose-red coloration is given: whilst in the case of neutral cocoanut soap and stock soap a darker red is produced—still more intense with alkaline soap,—a really decided decoloration only occurring when the greater portion of the soda present has been neutralised. The author has also shown, that concentrated solutions of soap are incapable of dissolving any large quantity of unsaponified fat, but merely emulsify same; and he, therefore assumes that the fat in superfatted soaps is not present in the form of a triglyceride. As a matter of fact, he has succeeded, by shaking up solutions of superfatted soaps with ether, in effecting the separation of mono- and diglycerides. Also in cases—such, for instance, as in that of dirt retained by fat—where the solvent capacity of the soap solution seems insufficient, the capacity for forming emulsions may perhaps be assumed the cause of the action of soap.

Wool fat has recently been employed in the preparation of toilet soaps.

In the case of milled soaps it is advisable to stir the wool fat up beforehand with its own weight of water, rose water, or orange water until a uniform pale yellow pulp is produced. On adding this to the well-dried soap shavings, it supples the mass and frees the finished soap from the presence of beads or streaks of fat, which are frequently observed when wool fat is used without any such preparation. The natural colour of the soap is a creamy tint; and this should not be more than assisted by a weak solution of pale yellow colouring matter, all high colours being avoided.

The proportions of the ingredients are as follows:—

Milled wool fat soap, with 10 per cent. of wool fat.—Well dried soap, 10 kilos; wool fat, 1200 grams—no soap should contain more than this proportion;—rose water, 600 grams; orange water, 600 grams, emulsified together, then mixed with the soap and allowed to draw overnight. The scent is compounded of geranium oil, 25 grams; lemon-rind oil, 10 grams; limetta oil, 10 grams; vanillin, 3 grams—as a 10 per cent. solution; oil of bitter almonds, 1·0 gram; violet root, 15 grams.

In the preparation of cocoanut-oil soap by the cold process, the great point is to get the right proportion of lye, 4—6 parts being taken to 10 of cocoanut oil. Wool fat, being unsaponifiable, requires no lye; immaterial whether it be added to the oil or employed in the new practical form of lana-cocoanut oil—100 parts of Cochin oil and 10 of wool fat.

Another recipe runs. The following ingredients—all well clarified—are carefully weighed out:—Cochin cocoanut oil, 5 kilos; very pale palm oil,—air-bleached at a low temperature,—1 kilo; wool fat for soap, 1 kilo. A highly caustic soda lye of sp. gr. 1·408, or 42° Be., is used,—2800 grams,—and is followed by 100 grams of water mixed with 100 grams of 28° Be. glycerin to improve the soap, this mixture being well stirred into the warm oil and lye. Finally, the scent—70—100 grams—and colouring, a pale cream yellow, are added. The mass soon thickens, and is then framed in order to secure uniform distribution and allow the air bubbles to rise. The frame is covered up and set in a warm place to induce a strong rise in temperature.

Bearing in mind the fact that almond oil is cheaper than olive oil, Schimmel & Co. have recommended the following method of saponifying the first-named oil by the cold process: After the sweet oil of almonds has been carefully saponified with weak lye, and salted out with a 20° Be. brine, 100 parts of oil are mixed with 34 of soda lye and 17 of potash lye (38° Be.) at 25° C., the mixture being kept stirred as in the case of cocoanut oil soap. The mixture must be stirred twenty-four to thirty-six hours, with intervals of rest, the stirring being performed for an hour after setting the ingredients in the pan (in the morning); thereafter the stirring is repeated for a few minutes at the end of every hour. The soap will not be ready for pouring by the evening, so that the pan must be left in a warm room all night, and then well stirred up the following morning, whereupon the soap will speedily thicken, and can be framed. Saponification sets in after another forty-eight hours, provided the mass is warm; and at the end of thirty-six to forty-eight hours longer the soap will be hard.

This almond oil soap completely replaces olive oil soap for cosmetic preparations, such as Hungarian beard pomade.* It dissolves in its own volume of distilled water to a fine clear paste, and is very agreeable to the skin.

Furthermore, 3 parts of cocoanut oil and 1 of sweet oil of almonds, saponified with a 38° Be. soda lye, furnish a very good lathering cocoanut-almond-oil soap, which seems to be very mild on the skin. This soap behaves in use like a good fat soap.

The following data are typical for the production of shaving soap from almond oil:—

Tallow, 85 parts, and sweet almond oil, 15 parts, are saponified with 25 parts of soda lye and an equal quantity of potash lye at 45—46° C. The saponification proceeds smoothly, and the resulting soap holds a brilliant fatty lather and is quite white. The bars do not undergo distortion, but remain rectangular. In view of its properties and the simple method of making, the operation is preferable to the plan of boiling, especially since the product fulfils all the requirements of a good shaving soap.

Shaving soaps by the cold process. The following recipes are given:—

1. Tallow, 29 kilos, and Cochin cocoanut oil, 28 kilos, are melted together, mixed with 15 kilos of sesame oil and 3 kilos of Venice turpentine, and saponified at 37°·5 C. (30° R.) by 87½ kilos of 38° Be. soda—from 120—125 per cent. caustic soda—by stirring in the usual manner; the soap is collected on the surface, framed, and well covered.

2. **Tallow**, **36**; Cochin cocoanut oil, 16; soda lye (37° Be.), **22**; **potash** lye (30° Be.), 6; Venice turpentine, 2.

3. **Tallow, 40; cocoanut oil, 8; potash lye (35° Be.), 20.**

4. **Tallow, 34; lard, 12; cocoanut oil, 6; olive oil, 4;**

castor-oil, 4; glycerin, 4; soda lye (36° Be.), 28; potash lye (38° Be.), 1.

Scent.—Three parts each of aniseed oil and lemon oil, and 2 parts of lavender oil, employed in the proportion of 4—6 parts per 1000 of soap.

According to the Swedish patent (7398 of 1895) taken out by M. Zadig of Malmö, a hygienic soap can be prepared by adding 3—10 per cent. of cream to a neutral soap. The cream is previously emulsified with 3—10 per cent. of pure lanolin, and is run into the soap as the latter is passing through the mill. With regard to this recipe, it has been rightly observed that the hygienic action of cream cannot be very important. Is it not probable that in summer time the butter fat, which apparently is not saponified, but merely mixed with the soap, would very soon become rancid and spoil the soap?

The makers of Pfund's Milk Soap published three analyses, with reports by Bischoff, Haggenberg, and Fresenius, with regard to which Hefelmann made the following observations:—

Milk soap is neither entirely nor chiefly prepared from pure cow's milk, but is merely a mixture of 80 per cent. of soap and 20 per cent. of dry milk. The product lacks the good qualities of the best toilet soaps prepared according to definite technical principles. Such soaps should be perfectly neutral, pure curd soaps, of constant composition and containing at least 75—80 per cent. of combined fatty acids. Milk soap is not boiled to curd, it has a strongly acid reaction, is very irregular in composition, and, according to reports from various sides, contains only 52—60 per cent. of combined fatty acids instead of the 64 per cent. mentioned in the guarantee analysis. The deficit of 20 per cent. of combined fatty acids, or 22 per cent. of dry soap, is replaced by 20 per cent. of milk constituents; of these, however, the milk fat alone has any cleansing action, all the others—about 15 per cent.—being merely so much worthless ballast.

The pure milk fat—5 per cent.—which is claimed to be so valuable, was found by Hefelmann and Haggenberg to be mixed with unsaponified soap fat, completely rancid, and consisting, to the extent of 4-5ths and 3-5ths respectively, of free fatty acids. The milk sugar had also undergone considerable decomposition, the natural ratio of milk sugar to casein in milk being reversed in the milk soap. Hefelmann concludes that every good pure neutral toilet soap with 75—80 per cent. of combined fatty acids, is far superior to such a milk soap.

Soap spirit is one of those articles which are prepared with more or less difficulty. It is a prevalent opinion that the addition of spirit facilitates the saponification of oil. This, however, is not altogether correct; in contrast to caustic soda, the saponification of oil with a caustic potash of the prescribed purity is an impossible matter, the presence of at least a small quantity of certain salts —such as potassium carbonate or chloride—or alcohol being absolutely essential. The addition of alcohol must be confined within certain limits; for, if these be exceeded, the saponification is considerably retarded, in addition to which there is a considerable waste of the spirit.

A standard soap spirit may be easily prepared in the following manner, in a very short time and with very little waste of spirit:—

60 parts of oil are heated with 70 parts of caustic potash lye for ten to twelve minutes in a long-necked flask on the steam bath. 25 parts of spirit are then added in 2—3 portions, at intervals of a minute, and the flask is repeatedly tilted. After about five minutes the saponification will be complete, and the remainder of the spirit and water may then be added, care being taken to keep the flask in continuous motion after the addition of the alcohol, and to leave it only a few seconds at a time on the steam bath. The loss of spirit will then not exceed 1 per cent.

Solid soap spirit has been recommended by Vollbrecht for disinfecting the skin and hands; and though it would appear to be chiefly intended for medical use, it may also be employed in the ordinary care of the skin, especially in cases where efficient disinfection is in question

60 grams of fine almond soap are dissolved in a sufficient quantity of 97 per cent. spirit with the assistance of the water bath, and the solution is then made up to 1 litre with spirit. The mass solidifies on cooling, and can be cut into sticks or filled into tubes.

For purposes of disinfection, the hand or skin is rubbed over with this soap by a brush, but without water. The alcohol evaporates and leaves adhering to the skin a thin layer of soap, which, however, does not make the hand too slippery.

Bacteriological experiments show that this soap will give results comparable with those furnished by the officinal soap spirit. This soap has the advantage of high stability and cheapness.

Concerning the employment of violet root powder in the preparation of toilet soaps, it is advisable to purchase the violet root or powder, the latter for choice, from a firm of known reputation.

Good violet powder should readily form into pills or globules when rubbed between the thumb and finger. Any one desiring to reduce the root to powder himself must employ a specially constructed mill or a mortar; if the latter be used, it should be covered over with a piece of leather to prevent the dust flying about the room. In using violet root powder in the preparation of toilet soaps by the cold process, it should be stirred into the mill shortly before saponification, the lye not being added until after the powder and oil are uniformly mixed. For milled soaps, the powder is intimately mixed with the soap cuttings, and the mixture run two or three times through the mill.

To prepare violet root tincture from the roots, 1 kilo of the powdered root is shaken up with 2 kilos of 95—96 per cent. spirit, the flask being agitated several times daily, and the operation repeated for ten to twenty days. The tincture is then filtered off, and the powder treated over again in the same manner with another 2 kilos of similar spirit. This second extract has a finer and more agreeable odour, and is employed for the preparation of "extracts."

A new and special use for petroleum jelly has been introduced by the celebrated Viennese surgeon, Professor Gersuny, namely, as a subcutaneous injection for restoring plumpness to sunken portions of the flesh. Thus injected, petroleum jelly retains its position, and does not affect the tissues. Gersuny has applied this treatment with success in several cases, and has reported on the same in the *Zeitschrift für Heilkunde*, 1900. Since that time the author has practised the method, and found it act satisfactorily in every case. The petroleum jelly used is not the viscous kind, but a mixture of paraffin-petroleum jelly oil, known as "Unguentum Paraffini"; and it has been demonstrated that paraffin, melting at 40° C., when injected into the corporeal tissues remains *in situ*, and does not produce any local irritation.

Gersuny applied this discovery to the production of a small swelling in such parts of the body where it seemed necessary to do so. Thus, for instance, in the case of a male subject whose upper jaw had to be removed, the consequent falling in of the cheeks was counteracted by this injection. Truly remarkable results have been attained by the new method as a substitute for sphincter muscles, a kind of flap valve being formed by the injected petroleum jelly mixture. Paraffin injections have also been successfully practised for improving the articulation in cases of so-called wolf's throat; and the new method is also in use for suppling stiffened joints, the trials made in this direction having been crowned with success. Very good results have also been obtained with paraffin injections in rectifying deformities, replacing lost bone, filling out the depressions left by contracted scars, etc.

Whether this method can also be extended to the domain of cosmetics must be left undecided for the present, since, through the hardening of the paraffin, the injected portions do not exhibit the same softness and roundness as the natural flesh. Nevertheless, the method is one of high importance for surgico-cosmetic purposes as for surgery in general, and has certainly a promising future before it.

# CHAPTER V

## GENERAL COSMETIC PREPARATIONS

GENERAL cosmetic preparations cover a rather wide field, inasmuch as they comprise not only such as are concerned with the care of the skin, but also the hair, teeth, buccal cavity, and callosities.

Many cosmetics have been developed into specialities, or are capable of being so developed with profit; these are dealt with in a separate section.

In this case, as in the case of special preparations, the rule should be followed of using only such materials as are perfectly innocuous to the health and well-being of the consumer. Apart from general considerations of humanity and morality, the manufacturer should not forget his liability to prosecution in the event of injury arising from the presence of noxious ingredients in his preparations. The position is further complicated by the circumstance that vanity, and the desire to conceal personal imperfections, are so dominant in some individuals, as to render them careless whether the articles they use are dangerous to health. This is a factor that should be prominently borne in mind, especially in recommending preparations for special purposes; and the straightforward manufacturer of cosmetics will discard any ingredients that are either useless for the purpose in view, or likely to prove injurious under prolonged use.

True, as regards the efficacy of many preparations, the position of the manufacturer is often a very unpleasant one. Even though he may personally feel a conviction that preparations for promoting the growth of the hair and beard, for example, are not able to do what is claimed for them, it would be acting contrary to the interests of his business were he to condemn such preparations in general. Purchasers of these articles are not dissuaded by such a course, and if they do not obtain the wished-for preparation at one seller's they resort to another. This necessity for supplying an existing want leads to the production of preparations which, even if harmless, are nearly or entirely valueless.

This explains why space has been accorded in the present work to certain preparations of an inferior character, the object of the book being to describe the manufacture of cosmetics on a technical scale, and not to serve as a guide to the laity.

Before, however, proceeding to details of preparation, the author will devote a little space to the general considerations underlying the proper application of cosmetics.

The care of the skin has been greatly facilitated by nature, the numerous glands present in the cuticle all serving some useful purpose. The human skin is composed of three separate parts: the under layer or future skin, the derma or true skin, and the epidermis or upper skin, which is very thin, and consists for the most part of dead or dying dermal cells; it is continually casting off scales and being recruited from the true skin.

The skin contains various extraneous structures, such as the sweat glands, which eject their well-known secretion; the fat glands, whose function it is to keep the skin covered with a layer of fat, and thereby soft, shiny, and supple; and, finally, the so-called hair bulbs forming the seat of the hairs.

The chief task in the rational care of the skin is to keep the said glands constantly in good health and working order. This end is attained by the employment of various preparations, which, in addition to maintaining the general well-being of the body, also impart bloom to the skin itself.

Personal beauty is really nothing more than the perfectly normal development of the face and body during complete health, and therefore the product of regular structure and normal function of the body. However, just as the health may be disturbed by the most divergent causes, so also can the skin, the seat of external beauty, be affected by alterations and diseases, which may exert such an injurious influence thereon as to unfavourably change the whole external appearance.

This is where the task of cosmetics comes into operation, to supply preparations suitable for the rational care and beautifying of the skin.

Pure glycerin is a substance having an extremely protective action on the skin, which it renders white, smooth, supple, and lustrous; in fact, sunburnt skin cannot be restored to its original light colour so quickly by any other means—except hydrogen peroxide—as by glycerin. The best method of using glycerin is as a wash, equal parts of viscous glycerin and orange-flower water—or some other aromatic water with a fine perfume—being mixed together and coloured rose-red by a very small quantity of fuchsine. Concentrated glycerin is unsuitable for use as a wash, because it absorbs moisture from the skin, and produces a sensation of burning or heat.

In such cases where the preparation is not necessarily liquid, but may be of the consistence of ointment, the glycerin may be advantageously replaced by petroleum jelly or lanolin.

In addition to ordinary soap, the so-called emulsions, pastes, vegetable milks, and crêmes form excellent means for improving the skin; in fact, they are, in some respects, superior to soaps, since they contain substances which have not only a cleansing action, like soaps of all kinds, but also render the skin lighter, clearer, and softer.

It is a frequent practice to draw a distinction between two groups of emulsions, namely, emulsions consisting of masses which, when brought into contact with water, exhibit the property of emulsifying in that liquid; and true emulsions, which already contain the necessary water, and therefore exhibit the characteristic milky appearance. The difference between the two, however, is very slight, consisting merely in the larger or smaller content of water; so that they may all be dealt with under one heading.

The milkiness of emulsions on being brought into contact with water is due to the circumstance that they contain, in addition to fat, substances possessing the property of converting the fat into exceedingly fine drops, as a result of which the entire liquid acquires the peculiar milky appearance. As a glance through the microscope will show, cows milk (and that of other animals) consists of a perfectly clear liquid containing the fat drops —butter globules—in suspension, the white colour of the milk being the result of the difference between the refractive property of these globules and that of the clear liquid.

Whereas soaps always contain a certain quantity of free alkali, the emulsions are almost, if not quite, destitute of this class of substance, and therefore, whilst sharing the cleansing properties of soap, are without its drawbacks. Consequently they are exceedingly adapted for the care of the skin, to which, when applied regularly, they impart a warm, fresh tint, as well as smoothness and delicacy.

Glycerin is a material of special value in the preparation of emulsions, not merely because of its property of softening the skin, but also on account of its capacity for dissolving colouring matters, so that it acts as a beautifier in the true sense of the word; skin that has been sunburnt ever so badly is turned quite white again in a surprisingly short space of time by the use of glycerin. In addition, glycerin retards the decomposition of preparations, and helps to retain them unchanged during prolonged storage.

The value of this latter property should on no account be underestimated, since all emulsions are particularly liable to decompose and turn rancid, owing to their content of finely divided fat. Complete exclusion of air, and storage at a low temperature, form the sole means, under ordinary circumstances, of retarding rancidity, which is accompanied by the disengagement of an unpleasant smell that cannot be masked by any perfume; but an addition of glycerin to any emulsion will at the same time render it more stable, thanks to the antiseptic action of the glycerin itself.

Another preservative which has long been known, and which is exceedingly powerful in this respect,—barley ½ per cent. being sufficient for the purpose,—is salicylic acid; this substance preventing decomposition of any kind, rancidity among others. This acid, being harmless, and without either taste or smell, can be used whether it is necessary to oppose the destructive influence exerted by air, ferments, etc., on different substances. Whereas it was formerly the practice to prepare emulsions in only small quantities at a time,—sufficient for a few weeks,—it is now possible, thanks to the preservative properties of salicylic acid, to make the emulsions on a large scale and store them for a long period, without fear of deterioration.

The only fats used for the preparation of emulsions are fatty oil of almonds, olive oil (both obtained by pressure), and lard. The almond oil can be advantageously prepared by pressing crushed almonds; the fresh almond shreds also find employment in cosmetics. The olive oil and lard must be purified in a most careful manner, by warming for an hour with about a tenfold volume of water, containing soap in the proportion of 1 part per 100 parts of the fat under treatment. The fat is afterwards washed 5 or 6 times with fresh quantities of clean warm water, until the washings have a neutral reaction, and do not colour either red litmus paper blue, or blue litmus paper red—the one reaction indicating the presence of free alkali (soap), and the other that of free fatty acids and therefore the existence of rancidity in the fat. Both of these would injure the quality of the product, more especially rancidity; and it is therefore essential that the fat should be perfectly neutral to test paper.

The so-called meals and pastes consist of the meal of vegetable substances containing fat, and exhibiting the property of forming an emulsion with water. They are frequently used as washes, and, being free from the smallest trace of alkali, form the most delicate of all such preparations, and are specially adapted for washing the face and delicate hands.

The various kinds of vegetable milk are nothing more than emulsions, already containing sufficient water to give them a milky appearance. They are employed direct as washes. Owing to their larger proportion of water, they are more liable to decomposition than the preparations already mentioned, the fats being extremely susceptible to fermentation,—rancidity,—which condition is further favoured by the extreme fineness of division.

To improve the keeping properties of these preparations, an addition may be made of 5-10 per cent. of glycerin, which at the same time increases their cosmetic value; equally to be recommended is an addition of ½ per cent. of salicylic acid, which will prolong the stability indefinitely. Each of the vegetable milks is compounded on the basis of a mixture of soap, wax, spermaceti, and some aromatic water, on which latter the specific name of the finished preparation usually depends. This composition is for the purpose of maintaining in suspension the fatty vegetable substance—almond meal, pistachio meal, etc.—which is the cause of the milky appearance of the liquid.

The crêmes, whilst similar in constitution to the emulsions and vegetable milks, differ from these latter in their thicker consistence, which renders them suitable for rubbing into the skin. The crêmes are really salves, scented with some well-known perfume, after which they are called. Fat is the chief component of these mixtures, and, being capable of imparting fulness and softness to the skin, is the cause of their hygienic influence. A properly prepared crême should have the consistence of freshly solidified wax, but give way, like pomatum, when pressed by the finger. The efficacy and beautiful transparent appearance of a crême can be improved by an addition of very thick glycerin; but this must be made with care, otherwise the mass will lack the proper consistence.

The preparation of cold cream entails the mixing of wax, spermaceti, and almond oil with an aromatic water and a perfume. The first stage is easy enough, the wax and spermaceti being simply melted together at the lowest possible temperature, and then incorporated with the almond oil by stirring. It is, however, more difficult to combine this basis with the rest of the components; the aromatic water is poured in, as a thin stream, with continued stirring, and it is only when the contents of the basin have become homogeneous that the perfume is added, this being done quickly, and the still fluid mass poured at once into the vessel in which it is to be kept. Since the introduction of Chinese gelatine, however, the preparation of cold cream has been greatly facilitated, wax, spermaceti, or paraffin being entirely dispensed with and replaced by Chinese gelatine, made up into a solution that will give the required consistence when it sets, and containing a small quantity of salicylic acid, to prevent rancidity. This gives a cold cream resembling marble or alabaster. These preparations are usually packed in decorative urns or porcelain vases, closed with ground stoppers or tinfoil-covered corks to prevent rancidity. The perfume must always be added last of all, and not until the mass has already been cooled down to solidification point, since, if added earlier, there is certain to be a good deal lost by evaporation.

The hair requires a certain care and preservation. It may be laid down as a general rule that the use of sharp combs and brushes for the hair should be entirely avoided, elastic combs and soft brushes alone being suitable for the purpose. The use of ordinary water for damping the hair is also to be deprecated, more particularly because hair moistened in this way soon disengages an objectionable smell. Furthermore, the immoderate plastering of the hair with fats and oils should be avoided, the natural fat in the hair itself being usually sufficient to keep it smooth; and even when this is not the case, as frequently happens, all that is necessary is a corresponding supplementary addition of oily matter. In such event the hair should be frequently cleansed with a lukewarm wash to remove the fat, which has a tendency to clog thereon along with dust and dirt. It is impossible to warn too strongly against a too frequent use of cold water,—such as washing the hair daily with cold water,—since this practice will inevitably result in baldness. In very many cases the employment of fat may be entirely superseded by moistening the hair and roots with glycerin twice a week. A suitable application of glycerin will also remove the troublesome scurf on the scalp. Beyond this, all meddling with the hair should be avoided by all who are desirous of preserving this growth. Dyeing the hair, even with the most harmless materials, and singeing the hair, are both highly injurious. The growth and well-being of the hair are furthered by the use of a pervious head covering, and by leaving the head bare in the hot weather.

The therapeutics of baldness—which appears to be continually on the increase—is not yet complete, notwithstanding the extensive and comprehensive experiments that have been made of late years. In many cases of baldness among females, it is not improbable that the cause may be traced to a neurotic condition, whilst in other instances everything points to a parasitic origin of the disease. To this class belongs undoubtedly the typical Alopecia areata, which has been definitely proved to be transmittable from one individual to another; consequently, the best treatment of this disease is of an antiparasitic character. The important treatment introduced by Lassar must be regarded as of this class; daily washing the hair for several minutes with coal-tar soap—or with sodium carbonate, 15·0; potassium carbonate, 15·0; medicinal soap, 70·0; rose water up to 200 parts,—followed by rinsing and drying. Following this treatment, the hair is rubbed with a 0·2 per cent. solution of corrosive sublimate, then with absolute alcohol containing ½-1 per cent. of naphthol, and finally with 2 per cent. salicylol. In addition, Lassar recommends first rubbing the roots of the hair with a paste composed of B-naphthol, 10·0; flowers of sulphur, 40·0; yellow petroleum jelly, 25·0; green soap, 25·0 parts. Then, after five to thirty minutes, 25 per cent. chrysarobin-lanolin is rubbed in with a pointed brush, the skin of the scalp being afterwards impregnated with tar oil, which is washed off with coal-tar soap. The head is then washed with the above solution of sublimate and naphthol alcohol, and oiled with 2 per cent. salicylol or 2 per cent. salicyl-petroleum jelly. A pomade composed of lanolin or horse fat, containing 2 per cent. of turpentine, is applied at night. Lassar does not hold a very high opinion on the utility of galvanic treatment, iodine tincture, or formalin, though, he does not deny they may occasionally be of service. Perhaps, also, the Finsen light treatment may have a favourable effect on this complaint.

Mention should also be made of Jackson's recommendations for the care of the hair, these being particularly *à propos* in cases where the hair has a tendency to fall out, as it often does after fevers. The scalp should be rubbed, once or twice a week, with a pomatum containing 1 gram of precipitated sulphur and 30 of cold cream, the hair being washed every two or three weeks, and oiled as soon as dry. Washing the hair too often is injurious. The best soaps to use for this purpose are the liquid kinds, *e.g.*, an alcoholic solution of Sapo viridis. It is important that the hair should be oiled after every washing, in order to prevent it getting too dry. When the hair is naturally poor in fat, it should be treated, at least once a week, with a hair oil that does not easily turn rancid. The hair may be cut as often as desired, but should not on any account be singed.

The basis of every hair pomade is some fat or other, which is scented with an agreeable perfume, and occasionally coloured. The fats most in use for this purpose are lard, beef marrow, tallow, olive oil, and almond oil, to which is added—of course, only in the case of solid fats—a certain quantity of paraffin, spermaceti, or wax, or better still Chinese gelatine, in order to improve the consistence of the pomade. Complete purity of the fat is essential, only absolutely neutral—acid-free—fat being permissible; whereas any that contains even a trace of rancidity—free fatty acid—is entirely precluded, on account of the penetrating smell appertaining to many of these acids.

Bersch gives the following recipe for preparing pure fats for this purpose. The fat is melted, with about a threefold quantity of water, in a bright iron, or, better still, enamelled vessel, the water containing an addition of 1 per cent. of alum and 1 per cent. of common salt, both calculated on the weight of the fat. The mixture of fat and water is worked about with a broad, flat paddle, though better results are obtained from a stirring apparatus attached to the melting pan, and, after the mass has been left alone for some time, the fatty coagulum is skimmed off the surface. When a small pump is available, the operation can be considerably accelerated by pumping the fat and water out of the pan, and allowing the mixture to return in the form of a fine spray.

When fat that is already partly affected with rancidity has to be purified for cosmetic purposes, the alum mentioned above should be replaced by a ½ per cent. solution of caustic soda.

After the fat has been treated sufficiently with water, it must be washed, in order to completely remove the substances employed in its purification. Formerly this washing was performed in a manner resembling the grinding of oil colours, the fat being spread on a flat plate and rubbed with a muller, in a stream of water flowing from a vessel above the plate, until purified. At present this expensive process has been replaced by a mechanical operation, the fat being treated with water in a vertical mill.

It sometimes happens that, even when the greatest care has been bestowed on the purifying of the fat, the pomades prepared therefrom become rancid on prolonged storage, a circumstance that may seriously damage the reputation of the manufacturer. Fortunately, two substances are known to possess the property of retarding the rancidity of fats, namely, salicylic acid and benzoin. Consequently, both these substances are largely used as preservatives in the preparation of cosmetics, especially for pomades. An addition of 1-5 parts of solid salicylic acid per mil. will suffice to attain the desired object, while in the case of benzoin about 20 grams are taken per litre of fat. This resin is almost completely soluble in fat, and imparts to the latter an odour of vanilla. For the finest pomades, use is made of sublimed benzoin in the proportion of 10-15 grams per litre of fat.

The care of the buccal cavity and teeth is a matter of enormous importance, and the preparations employed in this connection also belong to the domain of cosmetic technology.

It is essential that the mouth and teeth should be kept perfectly clean, a result impossible of accomplishment without the use of suitable mouth-washes and tooth-powders. In order to effectually combat the numerous bacteria peopling the buccal cavity, as well as to prevent the decomposition of residual organic matters in the mouth and to destroy same, antiseptic mouth-washes must be employed. At the first glance, salicylic acid would appear to be most suitable for this purpose, both on account of its general harmlessness and its predominant antiseptic properties. Nevertheless, it cannot be recommended at all, its decalcifying action on the teeth precluding its use. An experience of many years has convinced the author that the best of all mouth-washes is an alcoholic solution of thymol, dropped into water. One gram of thymol is dissolved in 30 grams of rectified spirit and kept as a stock solution. For use, 10-15 drops are placed in a glassful of water, and the mixture is held in the mouth for a short time, and the mouth finally rinsed out with the same. It is highly advisable to repeat this treatment both in the morning, after each meal, and again at night before retiring to rest. Inveterate smokers desiring to free their breath from the taint of tobacco smoke, can cleanse the buccal cavity with a very dilute solution of potassium permanganate, a couple of crystals of this salt being dissolved in a small glass of water—to which it imparts a rose-coloured tint. With this solution, which does not brown the teeth, the mouth is rinsed out several times.

In connection with the care of the teeth, the greatest errors are met with in the choice of tooth powders. Such powders as contain any attritive substances, like pumice, and even charcoal, should be avoided. In their normal condition, human teeth are covered with a hard lustrous mass of vitreous character, the so-called enamel, which offers great resistance to the action of acids or putrefying substances. On the other hand, this enamel is very sensitive to sudden changes of temperature, and is easily cracked, thus admitting acid or putrefactive substances to the interior of the teeth, and effecting their destruction. The true internal substance of the teeth consists of a porous mass of bone, which is easily destroyed; and when this takes place the whole of the teeth are completely spoilt. Tooth powder containing pumice acts on the teeth like a file, quickly wearing away the enamel and exposing the perishable internal substance. Charcoal, it is true, possesses valuable disinfectant properties, but this advantage soon disappears when it is remembered that charcoal always contains certain quantities of silica, *i.e.*, a substance capable of scratching glass, and one that must inevitably wear away the enamel of the teeth if used continuously for cleaning them.

According to the author's long experience, the best tooth powder is one composed exclusively of levigated chalk, perfumed with a few drops of oil of peppermint. It is, however, necessary to see that the brush used is not too hard. This chalk powder, applied to the inside and outside of the teeth with a soft brush, will clean them thoroughly, and the peppermint oil is refreshing and enlivening.

Experiments on the value of mouth washes have been performed by Dr. Karl Roese. The subject of the experiments was fed in the morning on coffee and bread, the mouth being then rinsed for one minute with a sterile solution of common salt and peptone, at blood temperature. One tenth of a c.c. of this solution was then examined for the presence of micro-organisms, the result being that a single dose of the rinsing liquid was found to contain from 10 to 800 millions of bacteria. This first rinsing was followed by a rinsing with the mouth wash under examination. It was finally ascertained by the experimenter that the more healthy the teeth and the stronger the muscles of the mouth, the larger the proportion of bacteria gaining access to the stomach.

According to these experiments, the strongest antiseptic is a mouth wash consisting of water containing benzoic acid and corrosive sublimate; this, however, being poisonous, is not suitable for daily use. Formaldehyde has no effect, a result to which its ready decomposibility largely contributes. Consequently, the preparation known as kosmin, the chief ingredient of which is formaldehyde, does not possess the value claimed for it.

Eau de Botot does neither good nor harm. Salicylic acid is injurious, owing to its decalcifying action on the teeth. A better preparation is the one known as Odol, on account of its content of salol.

An excellent, disinfecting, simple, and perfectly harmless mouth wash is afforded by 40 per cent. alcohol. This considerably widens the small blood vessels of the mucous membrane, and in this manner increases metabolism. This artificial circulation of the blood dissipates congestion in diseased gums, and restores the same to health.

The class of skin-beautifying preparations comprises rouge, preparations for concealing discoloured portions of the skin (freckles, moles), that would otherwise spoil the complexion, and the toilet powders used to impart whiteness and smoothness to the skin.

To take the rouges first, the use of these preparations can only be recommended to a limited extent. For theatrical purposes, rouge is indispensable. In the first place, the rouge should not contain any ingredient injurious to the skin; and, secondly, any preparation of this kind must be removed as quickly as possible, because it chokes the pores of the skin.

The preparations employed to remove or conceal freckles and moles seem to be of a very dubious character. Here, also, it should again be emphasised that the preparations ought not to contain any ingredients of a dangerous character. With regard to others, the manufacturer of these cosmetics has to face the point already referred to, namely, the use of materials he feels to be worthless; nevertheless, he must comply with the demand, if his business is to prosper.

Toilet powders are mostly of an innocuous character, and are applied to the skin by means of a powder-puff or a hare's foot. For the most part they consist of some kind of starch and powdered steatite, suitably perfumed, and often coloured as well. The kind of starch used is immaterial; rice, wheat, and potato starch all serve the same purpose, provided they are sufficiently white and finely powdered. The better the powder is rubbed into the skin, the whiter does the latter become, and the less is the powder noticeable.

According to the author's experience, the best face powder for keeping the skin clean, especially in the case of persons who perspire freely, is salicylic acid dusting powder.

As an appendix, consideration may be devoted to hair dyes, depilatories, and preparations designed to impart strength and gloss to the hair.

So far as hair dyes are concerned, it should be remarked that the production of any given hair dye is often only a question of fashion. The same fundamental rule must be followed in this case as in those already discussed, namely, that no injurious materials should be employed. In using hair dyes, it is essential, especially in the case of such as consist of two portions, to first free the hair from grease, since the chemicals employed do not stick on an oily surface. In dyeing the hair, it is advisable to use a dilute solution first, and if this does not produce the desired shade, the operation should be repeated; whereas it may happen that, by using the dye in a concentrated condition, the colour produced will not resemble that of any shade of natural hair. The complete removal of grease from the hair, previous to dyeing, may be effected either by washing the hair once or twice with soap, or with a dilute solution of soda. The hair must then be allowed to become thoroughly dry before applying the dye.

Depilatories are easily prepared, and are certain in their action, the substance of the hair being quickly destroyed. Of course, no injurious ingredients must be used. At the same time, it should be remembered that the effect of those preparations is, and can only be, the same as that of shaving, namely, to promote the after-growth of the hair treated; and a person who once commences to use depilatories is obliged to continue the practice at diminishing intervals. The only means yet known of effectually removing hair permanently is by electrical treatment, and the operation is too complicated and difficult to be successfully attempted except by a skilled medical man.

Wax pomades, stick pomades, or bandolines, serve to stiffen the hair. The active ingredients are wax, spermaceti, tragacanth, and gum arabic.

Brilliantines, or preparations for imparting gloss to the hair, consist chiefly of glycerin, suitably scented, and coloured light red or violet in order to improve the appearance. Since the aniline dyes are generally harmless, and at the same time soluble in glycerin, they are used for this purpose.

# CHAPTER VI

## MOUTH WASHES AND TOOTH PASTES

FORMALIN MOUTH WASH AND TOOTH PASTE. As a substitute for kosmin, the former is prepared in the following manner:—

Fifty grams of formalin—40 per cent. formaldehyde—are dissolved in 1000 grams of pure alcohol, then triturated with 200 grams of tincture of benzoin, 50 grams of myrrh tincture, 3 grams of peppermint oil, 2 grams of aniseed oil, 1 gram of oil of cinnamon, 15 drops of Ceylon cinnamon oil, and 2 grams of cochineal, the whole being then intimately mixed and filtered.

Formalin tooth paste is prepared by triturating 30 grams of formalin with 1000 grams of purest levigated chalk, then adding 200 grams of powdered violet root, 50 grams of magnesium carbonate, 100 grams of soap powder, 10 grams of peppermint oil, 2 grams of bergamot oil, and 1 gram of citronella oil, the whole being then mixed up to form a paste with about 700 grams of chemically pure glycerin.

Instead of 10 grams of peppermint oil, half that quantity may be taken, in conjunction with 3 grams of menthol.

AN ANTISEPTIC MOUTH WASH, which is said to retain its properties indefinitely, has been described by Huchard. It consists of a series of antiseptic substances, any of which taken separately would suffice, namely—

| | |
|---|---|
| Crystallised boric acid | 4·0 grams. |
| Eucalyptol | 1·0 gram. |

| | |
|---|---|
| Salol | 2·0 grams. |
| Menthol | 0·25 gram. |
| Thymol | 0·1 ,, |
| Alcohol | 100·0 ,, |

This can be scented according to taste, and coloured red with cochineal.

The same author has also given the following recipe for a SALOL TOOTH POWDER:—

| | |
|---|---|
| Salol | 4·0 grams. |
| Calcium phosphate | 20·0 ,, |
| Calcium carbonate | 20·0 ,, |
| Magnesium carbonate | 20·0 ,, |
| Sodium bicarbonate | 15·0 ,, |

This is scented with peppermint oil.

Frohmann (a Berlin dentist) recommends the following soap for brushing the teeth:—Thymol, 0·25; ratanhia extract, 1·0 in 6·0 of hot glycerin; calcined magnesia, 0·5; sodium biborate, 4·0; medicinal soap sufficient to make the whole up to 30·0; peppermint oil, 1·0.

This soap should be used after dining, and again before retiring for the night. By altering the proportions of the sodium biborate and soap, the same recipe may be also made up as a tooth powder.

A stable aqueous solution of thymol is prepared by Hermite by adding caustic soda and tartaric acid to a 0·05 per cent. solution of thymol in water, this strength being quite sufficient for antiseptic purposes. One gram each of thymol, tartaric acid, and pure, dry caustic soda is dissolved in a minimum of warm water, and the solution diluted with distilled water to 2 litres. It will remain clear for any length of time.

A EUCALYPTUS TOOTH PASTE may be prepared from 160 grams of precipitated chalk,—levigated chalk,—45 grams of soap powder, 45 grams of wheat starch, 1 gram of carmine, 30 drops of peppermint oil, 30 drops of geranium oil, 60 drops of eucalyptus oil, 12 drops of clove oil, and 12 drops of aniseed oil, mixed together and made into a paste with a mixture of glycerin and alcohol in equal parts.

### EAU ANATHERINE

| | |
|---|---|
| Guaiacum wood | 100 grams. |
| Myrrh | 250 ,, |
| Cloves | 150 ,, |
| Santal wood | 150 ,, |
| Cinnamon | 50 ,, |
| Alcohol | 4 litres. |
| Rose water | 2 ,, |
| Mace oil | 5 grams. |
| Rose oil | 5 ,, |
| Cinnamon oil | 5 ,, |

The solids are digested with the alcohol, the ethereal oils are dissolved in the filtered liquid, and the rose water is added last.

### EAU DE BOTOT

This tooth tincture is prepared in different ways, the most highly appreciated being those from the French and English recipes. An ingredient often used in their preparation is ratanhia root, from *Krameria triandra*, a plant indigenous to South America. The root is long, about as thick as a quill, rounded in shape, and with a strongly astringent taste. The alcoholic extract is coloured red.

(*a*) French recipe—

| | |
|---|---|
| Aniseed | 280 grams. |
| Cochineal | 20 ,, |
| Mace | 10 ,, |
| Cloves | 10 ,, |
| Cinnamon | 80 ,, |
| Peppermint oil | 20 ,, |
| Alcohol | 3 litres. |

(*b*) English recipe—

| | |
|---|---|
| Cedar essence | 4 litres. |
| Myrrh essence | 1 litre. |
| Ratanhia essence | 1 ,, |
| Lavender oil | 20 grams. |
| Peppermint oil | 30 ,, |
| Rose oil | 10 ,, |

### EAU DE BORATE DE POTASSE (BORAX TOOTH TINCTURE)

| | |
|---|---|
| Borax | 150 grams. |
| Myrrh | 150 ,, |
| Red santal wood | 150 ,, |
| Sugar | 150 ,, |
| Eau de Cologne | 1 litre. |
| Alcohol | 8 litres. |
| Water | 1½ ,, |

The solids are digested with the alcohol, the eau de Cologne being then added, followed by the water in which the sugar and borax have previously dissolved. Finally, the whole is filtered.

### EAU DE PERMANGANATE DE POTASSE (POTASSIUM PERMANGANATE WATER)

| | |
|---|---|
| Potassium permanganate ... ... ... | 100 grams. |
| Distilled water ... ... ... ... | 5 litres. |

The potassium permanganate dissolves readily in the distilled water, and gives a beautiful violet solution, a few drops of which are added to a glass of water at the time of using. After the mouth has been cleansed with this solution, a little peppermint water is preferably used for brushing the teeth. On linen and other stuffs, as well as on the skin itself, the above mouth wash leaves brown stains, which can only be removed by the aid of hydrochloric acid.

### EAU DE SALVIA (SAGE WATER)

| | |
|---|---|
| Lemon oil ... ... ... ... | 20 grams. |
| Sage oil ... ... ... ... .. | 50 ,, |
| Alcohol ... ... ... ... ... | 1 litre. |
| Water ... ... ... ... ... | 4 litres. |

The ethereal oils are dissolved in the alcohol, and the solution is united with the water.

### EAU DE VIOLETTES (VIOLET WATER)

| | |
|---|---|
| Violet root essence ... ... ... | 1 litre. |
| Eau de roses, triple .. ... ... | 1 ,, |
| Alcohol ... ... ... ... ... | 3 ,, |
| Oil of bitter almonds ... ... ... | 5 grams. |
| Neroli oil ... ... ... ... | 2 ,, |

---

### THE PREPARATION OF FACE POWDERS AND ROUGES

The machinery for manufacturing these preparations consists of a series of apparatus disposed in such a manner that the ingredients can be conveyed from one part to another by means of worm conveyors. The motive power is supplied by a 4-h.p. electro-motor.

In making LANOLIN or GREASE POWDER, the *modus operandi* is as follows:—

The lanolin or fat is placed in a copper vessel, situated at one side and connected with the main apparatus, and is therein heated to melting point—30-40° C.—by means of hot water, which surrounds the entire apparatus. When this point is reached, the fat is drawn up into a cylinder in the top of the apparatus, by lifting a plunger, a tap in the bottom being then closed in order to prevent the fat flowing back into the heating pan. On allowing the piston to descend, by its own weight and that of the loaded piston-rod to which it is attached, the fat is forced through a perforated false bottom or sieve, situated between the cylinder and the lower part of the apparatus, and is delivered into the latter in the form of fine spray. To ensure the intimate admixture of this spray with a portion of the dry powder, the latter is carried from a vertical storage cylinder by means of a worm conveyor, from which it is blown into the apparatus by the aid of a fan, as a fine dust, through two orifices in the mixing chamber.

The progress of this operation can be followed by looking through a small window in the lower part of the apparatus. The mixture of fat and powder falling to the bottom is set in motion, by stirrers driven from below, to break up any balls of powder that may have formed. At the end of three to four hours the mixture is withdrawn and transferred to another mixing chamber behind the fan, where it is treated with ether, to enable the fat to take up a further quantity of powder. When the ether has been evaporated, there remains a fine powder, forming the basis of the cosmetic in question.

This fatty powder is next mixed with the numerous ingredients by mechanical means, and transported, on a worm conveyor fed by a hopper, to a horizontal drum on the right of the fan, where the different ingredients are united to a homogeneous powder by means of two large rollers, one of which is closely set with short bristles, the other being of fluted wood. The rollers run in opposite directions. On the inner walls of the drum are arranged fan-shaped shovels, which return the materials to the rollers several hundred times in succession. As soon as this treatment is completed, the contents of the drum are automatically transferred to a centrifugal sifting machine, situated directly underneath and covered with fine gauze.

The powder passing through the meshes of this machine falls into an adjacent worm conveyor, and is delivered, in an upward direction, on to plush rollers, which impart softness and tractability to the powder. Thence it falls through a funnel-shaped tube, and, after being scented, is packed in tins or boxes for sale. By means of this machine about 5 cwt. of powder can be manufactured in a day (ten hours).

The machine for preparing DRY ROUGE PASTE is fed with the rouge powder through a funnel, which delivers the powder into a hollow iron body, from which a sufficient quantity of rouge is discharged at each stroke of the machine to fill a hollow chamber corresponding in size and shape with the block of rouge paste to be manufactured. In this chamber the powder is subjected to the simultaneous pressure of two pistons, acting from above and below respectively, which compress it into a solid lump, and at the same time impress it with the desired design or marks on the upper side. During the return stroke of the machine, the compressed block falls out of the mould, and is then removed and packed into boxes, etc.

**STARCH** is used for toilet purposes under various names, either alone or mixed with perfumes or colouring matters. All manner of fancy names are bestowed on these preparations: **Blanc végétal, Poudre du Sérail, Poudre de**

Riz, etc., all meaning the same thing, namely, well-washed potato-starch powder. This latter, in fact, is the only form of starch used for toilet preparations, the so-called rice powder being merely potato starch that has been well washed by levigation. Wheat starch is unsuitable for the purpose, owing to the cohesion of the individual granules. Starch may be scented with any desired perfume, but preference is given to such as are most lasting, violet root being in special favour.

Starch may be scented direct by mixing it with powdered violet root. It is, however, difficult to reduce the violet root to such a fine state of division as is required for the purpose in view, to render the granules indistinguishable from those of starch. For finer goods it is therefore preferable to perfume the starch with the scent of the violet roots, without bringing it in contact with the cellular matter of the root. This object is attained by extracting the perfume from the root by treating it with alcohol in a closed vessel for several weeks, the solvent then acquiring the agreeable odour of the root. On employing this alcoholic solution to sprinkle a quantity of starch powder, and leaving the latter to dry, the solvent evaporates, leaving behind the volatile oil. The perfumed starch must, however, be packed at once into tins or tightly closed boxes, since the scented oil of violet root soon loses its aroma when exposed to the air, and is converted into an inodorous substance.

The same process is applied to the scenting of starch with other perfumes, the odorous vegetable matter being extracted with alcohol, and the solution employed to moisten the starch. Many perfumes are obtainable in a pure state, such as caraway-seed oil, lemon oil, bergamot oil, etc., and these when converted into an alcoholic solution are used to sprinkle the starch spread out in a thin layer.

Toilet starch is also frequently coloured, usually red, in order to impart a delicate red tint to the skin. Only very fine red colouring matters are suitable for this purpose; and pure carmine and finest madder lake are most esteemed. In order to secure the most intimate possible admixture with the starch it is necessary to add the finely divided colouring matter by degrees, each portion being well triturated with the starch, and the whole finally united and shaken up in a large wooden box. Where large quantities are to be manufactured, it is advisable to effect the mixing in a rotary drum until the starch appears to be of a uniform colour throughout.

Starch that has been coloured red is frequently scented as well, the perfume in this case being imparted by the oil of geranium rose, which has a very delicate odour, resembling true oil of roses. Such scented coloured starches are sold under names like Rose Powder, Poudre de Riz à la Rose, Poudre des Dames Rosée, etc.

The preparation of good powders entails the use of snow-white steatite powder, very light calcium carbonate, starch, and zinc white. The best flesh tints for blondes is obtained with carmine alone, whilst for brunettes the powder is coloured with burnt umber or sienna. An addition of finely powdered violet root is recommended, since it gives the preparation a fine perfume.

A very good powder is prepared from the following recipe:—

Zinc white, 200 grams; precipitated chalk, 3000; steatite powder, 500; wheat starch, 1000; essence of white rose, 30; jasmine extract, 30; orange-flower extract, 30; cassia extract, 30; musk tincture, 7½ grams.

The following American recipes for FACE POWDER are also worthy of attention:—

| | | |
|---|---|---|
| 1. | Zinc oxide ... ... ... ... | 76 grams. |
| | Precipitated chalk ... ... ... | 96 ,, |
| | Powdered talc (steatite) ... ... ... | 16 ,, |
| | Starch powder ... ... ... ... | 32 ,, |

This mixture is scented with a sufficient quantity of extract of roses, jasmine, orange flowers, cassia, or musk.

| | | |
|---|---|---|
| 2. | **Magnesium carbonate** | 8 grams. |
| | **Powdered talc** | 16 ,, |

Scented with the necessary amount of rose oil.

| | | |
|---|---|---|
| 3. | **Starch** | 7 grams. |
| | Rice meal | 1 ,, |
| | Powdered talc | 1 ,, |
| | Orris root | 1 ,, |

Scented the same as No. 2.

| | | |
|---|---|---|
| 4. | Zinc oxide | 4 grams. |
| | Rice meal | 14 ,, |
| | Precipitated chalk | 4 ,, |
| | Powdered talc | 2 ,, |
| | Orris root | 2 ,, |

Scented like No. 1.

| | | |
|---|---|---|
| 5. | Zinc oxide | 2 grams. |
| | Orris root | 2 ,, |
| | Rice meal | 16 ,, |

Scented with the necessary quantity of rose oil, geranium oil, ylang-ylang, cumarin, or acetic ether.

---

### FACE POWDER, WHITE

| | |
|---|---|
| Finest levigated zinc white | 50 grams. |
| Venetian talc | 50 ,, |
| Magnesium carbonate | 50 ,, |
| Rose oil | 20 drops. |
| Orris oil | 30 ,, |

The whole being intimately mixed.

### FACE POWDER, ROSE

| | |
|---|---|
| Above white powder | 150 grams. |
| Carmine | 0·50 gram. |

### POUDRE DE PISTACHES (PISTACHIO POWDER)

| | |
|---|---|
| Pistachio meal | 5 kilos. |
| Steatite | 5 ,, |
| Lavender oil | 20 grams. |
| Rose oil | 15 ,, |
| Cinnamon oil | 5 ,, |

The pistachio meal must be entirely free from oil, and ground as fine as possible.

### ROSE POWDER

| | |
|---|---|
| Starch | 10 kilos. |
| Carmine | 20 grams. |
| Rose oil | 15 ,, |
| Santal oil | 15 ,, |
| Betiver oil | 10 ,, |

### VIOLET POWDER

| | |
|---|---|
| Starch | 5 kilos. |
| Violet root | 5 ,, |
| Bergamot oil | 20 grams. |
| Lemon oil | 20 ,, |
| Clove oil | 10 ,, |
| Neroli oil | 10 ,, |

### SALICYLIC ACID POWDER

| | |
|---|---|
| Starch | 500 grams. |
| Salicylic acid | 10 ,, |

### SKIN GLOSS

| | |
|---|---|
| Sodium carbonate | 50 grams. |
| Powdered spermaceti | 50 ,, |
| Starch | 500 ,, |
| Bitter almond oil | 10 ,, |
| Benzoin | 20 ,, |

The ingredients are intimately mixed, and then stored in tightly closed packages. For use, the mixture is stirred in with a little water.

### CALODERM

| | |
|---|---|
| Wheat starch | 2 kilos. |
| Powdered almonds | 500 grams. |
| Violet root | 500 ,, |
| Rose essence | 500 c.c. |
| Glycerin | 200 ,, |

The whole is mixed to a paste, which is diluted with water before applying to the skin.

### PATE AU MUSC, FOR WASHING THE HANDS

| | |
|---|---|
| Powdered white soap | 1000 grams. |
| Violet root | 250 ,, |
| Starch | 250 ,, |
| Lemon oil | 20 ,, |
| Neroli oil | 10 ,, |
| Musk essence | 5 c.c. |
| Glycerin | 40 ,, |

The mass is boiled until it forms a homogeneous paste, and this is then packed in flat porcelain pots.

## ROUGE.

The following preparations can be recommended as fulfilling their purpose, without injuring the skin in any way:—

### FRENCH WHITE

| | |
|---|---|
| Steatite | 2 kilos. |
| Lemon oil | 5 grams. |
| Bergamot oil | 5 ,, |

The steatite is reduced to the finest possible state of division, then levigated, dried, and scented. On account of its greasy character it easily sticks to the skin, and forms the best of all cosmetics of this class, being unalterable in colour and without any injurious action on the epidermis.

### LIQUID PEARL WHITE

| | |
|---|---|
| Rose water | 1 litre. |
| Orange flower water | 1 ,, |
| Basic bismuth nitrate | 500 grams. |

When allowed to stand, the bismuth nitrate settles down completely, leaving the supernatant liquid quite clear. It is therefore necessary to shake up the preparation before use. If left on the skin for any length of time, this cosmetic turns yellow, in consequence of the formation of black bismuth sulphide.

### LIQUID VEGETABLE ROUGE

| | |
|---|---|
| Ammonia | 60 grams. |
| Carmine | 35 ,, |
| Esprit de roses, triple | 70 ,, |
| Rose water | 2 litres. |

This cosmetic, which is chiefly used for colouring the lips, is prepared by digesting the finely powdered carmine with the ammonia for several days in a 4-litre flask, then adding the other ingredients, and leaving the whole to stand another week, with frequent shaking. After the sediment has completely settled down, the clear supernatant liquid is decanted into bottles for sale.

In order to obtain this preparation as it should be, neither trouble nor expense must be spared in obtaining the very finest carmine procurable, this being the only way of producing a brilliant vivid red preparation of the proper shade for the lips.

### SOLID ROUGE (ROUGE EN PATE)

| | | |
|---|---|---|
| Carmine | 30 | grams. |
| Talc (steatite) | 600 | ,, |
| Gum arabic | 50 | ,, |

The ingredients are powdered as finely as possible, then intimately mixed by trituration in a porcelain mortar, and formed into a paste by the careful addition of water. This paste is packed in very shallow porcelain pots, about 1½ inches in internal diameter. A darker rouge, such as is required for the stage or for persons with brunette complexions, is obtained by increasing the proportion of carmine.

### LEAF ROUGE (ROUGE EN FEUILLES)

Circular discs, about 2 inches in diameter, are cut from thick, very smooth, highly satinised paper, and covered with a layer of carmine, the adhesion of which to the paper is secured by an addition of gum arabic. For use, all that is necessary is to breathe on the leaf, rub it over with a ball of fine cotton-wool, and apply the latter to the face.

### VEGETABLE BLUE FOR VEINS (BLEU VEGETAL POUR LES VEINES)

| | | |
|---|---|---|
| Venetian chalk | 500 | grams. |
| Berlin blue | 50 | ,, |
| Gum arabic | 30 | ,, |

The powdered ingredients are converted into paste with a little water, and then shaped into sticks. For use, the stick must be breathed upon, then rubbed with the rough side of a piece of white glove leather, and the blue veins traced on the skin, which has previously been coated with pearl white. That a certain amount of skill is necessary to produce the proper effect, goes without saying.

### VEIN BLUE FOR THEATRICAL MAKE-UP

| | |
|---|---|
| White bole ... ... ... ... | 80 grams. |
| Zinc white ... ... ... ... | 10 ,, |
| Berlin blue ... ... ... ... | 10 ,, |
| Gum arabic ... ... ... ... | 3 ,, |

These ingredients are worked up to a plastic mass with orange-flower water, then made into sticks, about ¼ inch thick, and dried.

### HYDROGEN PEROXIDE FOR THE SKIN

For delicate skins, hydrogen peroxide may be used as a wash, if diluted with its own volume of water, a little ammonia—1-2 drops to a dessert-spoonful—being added to the wash at the time of use. Where the hydrogen peroxide comes in contact with the skin, small bubbles of oxygen will be observed to form, whilst at the same time the dead rough surface of the skin will be converted into a white, soap-like mass. Since the peroxide destroys merely the dead portions, the smooth skin makes its appearance, and, being left unattached in any way, soon becomes strong and able to resist external influences.

### BIRCH LEAF AND ST. JOHN'S WORT OINTMENT

A patented preparation from the above ingredients is used for burns and roughness of the skin. The half-unfolded young leaves of the birch tree are extracted with alcohol for a week, the dark green resinous extract, then obtained by pressure, exhibiting the aromatic odour of the birch, and containing all the efficacious constituents of the leaves.

The freshly cut St. John's wort, gathered while in bloom, is digested for three weeks with a mixture of wool fat and oil at about 40° C. The viscous reddish-brown extract recovered by pressure contains all the active ingredients of the sap, in consequence of the faculty of wool fat for taking up aqueous liquids.

The two extracts are mixed in equal proportions, and, on the alcohol being driven off by evaporation, furnish a dark green ointment.

OF INDUSTRIES
DIRE

# CHAPTER VII

## HAIR DYES, DEPILATORIES, AND HAIR RESTORERS

### *Preparations for Darkening the Hair*

#### BLACK DYES

1. THIS dye consists of a 2-5 per cent. solution of silver nitrate, supersaturated with ammonia. It is applied to the hair after the latter has been well washed with soap. When the foregoing solution has dried on the hair, a second solution is applied, consisting of dilute alcohol containing 3-4 per cent. of pyrogallic acid, or a 6-8 per cent. solution of potassium sulphide..

2. The pericarp of the cashew apple contains, in addition to gallic acid, two special organic substances, one of which, cardol, is of oily consistence, and has a highly stimulative action on the skin; whilst the other, anacardic acid, which is for the most part present in the free state in the husk, does not share the injurious properties of cardol. To extract it from the pericarp, the latter is cut up and treated with ether, the solvent being driven off and the residue extracted with water until the washings cease to give the tannic acid reaction. The residue is then dissolved in 15-20 parts of alcohol, and shaken up with freshly precipitated lead hydroxide, quickly filtered, and washed with alcohol. It is advisable to exclude air as far as possible during this process. The precipitate consists of lead anacardate, whilst the cardol, being

left behind dissolved in the alcohol, is thus separated from the anacardic acid. On treating the precipitate with ammonium sulphide and sulphuretted hydrogen, and filtering the liquid, the filtrate will contain, in addition to the excess of ammonium sulphide, the anacardic acid in the form of an ammonium salt. The filtrate is then concentrated to a small volume, and treated with sulphuric acid, which causes the deposition of the anacardic acid in the form of white masses which quickly solidify. These masses are pressed between filter paper and then dissolved in ammonia, the solution being soluble in water, and forming a hair dye. In application, the hair is rubbed over with this solution, and afterwards combed with a comb dipped in ferrous sulphate, whereupon it soon assumes a more or less black colour, which is fairly lasting. Anacardic acid can also be made up into a pomade with vaseline or hair oil; and ferrous sulphate may be replaced by iron oleate as the developer. This last-named compound is obtained by the interaction of ferrous sulphate and medicinal soap. It is advisable to keep both the anacardia pomade and developer in tin tubes.

3. *Tannin Hair Dyes* —(*a*) In a clear glass bottle—

| | |
|---|---|
| Powdered gall nuts ... ... ... | 400 grams. |
| Water... ... ... ... ... | 500 ,, |
| Rose water ... ... ... ... | 500 ,, |

The gall nuts are boiled with the water, the boiling liquid being strained through a close cloth into the rose water, and filled, whilst still hot, into the bottles, which should be closed at once. Unless filled while hot, the contents of the bottles are liable to develop mould.

(*b*) In a dark bottle—

| | |
|---|---|
| Silver nitrate ... ... ... ... | 150 grams. |
| Water ... ... ... ... | 1 litre, |

together with sufficient ammonia to redissolve the precipitate formed at first.

4. *Melanogene.*—(*a*) In a dark bottle—

| | |
|---|---|
| Silver nitrate | 10 gram. |
| Distilled water | 80 ,, |
| Ammonia | 30 ,, |

(*b*) In a clear glass bottle—

| | |
|---|---|
| Pyrogallic acid | 1 gram. |
| 40 per cent. alcohol | 500 grams. |

5. *Eau d'Afrique.*—(*a*) In dark bottles—

| | |
|---|---|
| Silver nitrate | 3 grams. |
| Distilled water | 100 ,, |

(*b*) In clear glass bottles—

| | |
|---|---|
| Sodium sulphide | 8 grams. |
| Distilled water | 100 ,, |

6. *Krinochrome.*—(*a*) In clear glass bottles—

| | |
|---|---|
| Pyrogallic acid | 10 grams. |
| Distilled water | 180 ,, |
| Alcohol | 100 ,, |

(*b*) In dark bottles—

| | |
|---|---|
| Silver nitrate | 12 grams. |
| Ammonia | 60 ,, |
| Distilled water | 300 ,, |

7. Potassium permanganate, 150 grams; distilled water, 2 litres. The hair is washed, and the solution is applied with a soft brush; the dye takes effect immediately, and the hair is coloured, according to the degree of dilution, all shades, from blonde to the deepest brown.

8. One part of powdered peat, free from sand, is left in contact with 10 parts of ammonia and 5 parts of water for two days in a glass flask, then slowly heated to boiling, strained through a cloth, and concentrated to the consistence of syrup, on the water bath. The resulting brown extract is dissolved in 10 parts of distilled water containing 2 parts of alcohol and a little eau de Cologne. After the hair has been washed with soap, spirit and water, to remove grease, it is damped with the brown liquid.

9. *Bismuth Hair Dye.*—One hundred grams of metallic bismuth are dissolved in a sufficiency of ordinary nitric acid (about 280 grams), the solution being treated with a concentrated solution of 97 grams of tartaric acid, and precipitated by a copious addition of water. The precipitate is then washed with water until the washings no longer give a strong reaction with blue litmus paper, after which it is carefully separated from the filter paper and dissolved in ammonia. This solution is employed to dissolve 75 grams of purified sodium hyposulphite, filtered, treated with an addition of 2—5 per cent. of glycerin, and filled into bottles. It contains about 5 per cent. of bismuth, and should be applied once daily to the hair or beard to be dyed. The colour develops slowly to a deep brown, and when this result is produced further applications are made only as required.

10. Two liquids are used: (*a*) 10·15 glycerin, 6·42 sal ammoniac, 76·18 water, and 7·25 bismuth nitrate; (*b*) 1·05 pyrogallic acid, 13·68 sodium hyposulphite, and 85·27 gaultheria water.

### BLONDE DYE

1. A dilute solution of hydrogen peroxide is applied with the brush, after freeing the hair from grease.

2. (*a*) 5·0 potassium permanganate, 95·0 distilled water. This solution is kept in a brown bottle, with ground stopper.

(*b*) 1·0 sodium hyposulphite, 25·0 distilled water. The hair is washed with a solution of soda, rinsed with warm water, and dried. Solution (*a*) is then applied with a brush and comb (which must not be greasy), and evenly distributed through the hair. To remove stains on the skin, a small rag is moistened with water, followed by a little soap and solution (*b*), and used to rub out the stains.

3. The hair, freed from grease, is moistened with a mixture of 1 part of iron acetate, 1 part of silver nitrate, and 2 parts of bismuth nitrate dissolved in 10 parts of water,

the colour being developed, after the lapse of an hour, by means of a solution of potassium bisulphide in its own weight of water.

4. A yellow hair dye may be obtained by the aid of Orleans, boiled in water that has been rendered slightly alkaline with soda. The hair must first be washed with a solution of alum. A Nanking yellow colour can be imparted to hair by treating it with a dissolved neutral salt of iron, *e.g.*, sulphate, acetate, or chloride, followed by a solution of an alkali—sodium carbonate, potassium carbonate, or lime water. This dye will modify the colour of fiery red hair.

Preparation for darkening red hair. A solution is prepared of 3·5 grams of calcium saccharate, 15 grams of glycerin, 7 grams of jockey club, 15 grams of rectified spirit, and sufficient water to make 300 c.c. With this liquid the hair is sprayed every morning, and then well brushed.

## *Depilatories*

### CALCIUM SULPHIDE

This preparation is made ready in the following manner:—Quicklime, calcined to whiteness, is suffused with water,—an operation requiring some care, owing to the heat disengaged,—the resulting powder being shaken loosely into a high glass, containing a wide glass tube reaching to the bottom and connected with an apparatus charged with water and ferrous sulphide. On treating the latter with sulphuric acid, sulphuretted hydrogen is disengaged, and, passing through the aforesaid tube, is immediately absorbed by the lime. When the absorption is complete and the whole of the lime has been converted into calcium sulphide, as may be recognised by the escape of sulphuretted hydrogen from the lime vessel, the generator is disconnected, and the calcium sulphide is worked up into a paste, as follows:—

| | |
|---|---|
| Calcium sulphide ... ... ... | 2 kilos. |
| Sugar ... ... ... ... | 1 kilo. |
| Water ... ... ... ... | 1 ,, |
| Starch ... ... ... ... | 1 ,, |
| Lemon oil ... ... ... ... | 30 grams. |
| Peppermint oil ... ... ... ... | 10 ,, |

This paste must be packed immediately into air-tight pots, since the calcium sulphide is decomposed on exposure to air. For use, a little of the mass is moistened with sufficient water to make it easy of application to the skin, and is laid on the hairs to be removed. At the end of a half to three-quarters of an hour, the whole must be washed off with water.

### BARIUM SULPHIDE

This preparation can be obtained by passing sulphuretted hydrogen over solid barium hydroxide and mixing the product with starch paste. It is similar in action to calcium sulphide, but has the disadvantage of being more expensive and less stable.

### BARIUM SULPHIDE PASTE

This must always be prepared immediately before use by stirring up barium sulphate, carbon, and linseed oil to a paste, and calcining the mixture thoroughly, a dark blue product, barium sulphide, being obtained. Ten parts of this, rubbed down fine, are mixed with 5 parts of zinc oxide and 5 parts of starch, the powder being incorporated with sufficient water to form a soft paste, which is then spread fairly thick, by the aid of a wooden spatula, on the hair to be removed. When perfectly dry, *i.e.*, in about ten minutes, the paste is washed off with water, and leaves the skin clear and free from hair.

According to the patent specification of G. Huettemann and J. Zrzawy, of Brüx (Bohemia), a stable depilatory, which does not affect the skin, is obtained by quenching quicklime with a solution of sugar, and passing sulphuretted hydrogen through the resulting solution of calcium saccharate. The process can also be modified by first preparing a solution of sugar saturated with sulphuretted hydrogen, and then stirring this up with the lime. This furnishes a pale green mass, which is then mixed with such a quantity of lime that the mixture contains about 5 per cent. of the fundamental substance.

For use, this mixture is stirred up to a pap with water, and applied to the surface to be freed from hair, the whole being washed off again after about ten minutes.

### *Hair Restorers*

After a long period of neglect, the beneficial effect of bay rum on the scalp is beginning to be more and more widely recognised on the Continent. This solution of bay oil in alcohol is renowned for its refreshing action in cases of nervous headache, languor, and other nervous disorders.

Even superior to bay rum as a hair wash, is the following preparation:—

A solution is made of 11 grams of bay oil and 5 drops of clove oil, in 500 grams of alcohol, with which are incorporated 1500 grams of tincture of Quillaya bark and 10 grams of Tinct. Capsici annui. The whole is mixed with 0·5 gram of mace and 15 grams of ammonium carbonate, with frequent shaking, and is filtered at the end of three days. Even repeated filtration, however, will scarcely furnish a clear solution, and therefore the liquid should be stored in blue or opaque bottles. The Quillaya bark tincture is prepared by digesting 20 parts of Quillaya bark with 100 of alcohol, and mixing with 120 parts of rose water, 20 of eau de Cologne, and 80 of glycerin.

The following recipes have been given for preparing bay rum:—

| | |
|---|---|
| Bay oil ... ... ... ... | 16 parts. |
| Clove oil ... ... ... ... | 1 part. |
| Pimento oil ... ... ... ... | 1 ,, |
| Jamaica rum essence ... ... ... | 75 parts. |
| Alcohol ... ... ... ... | 2650 ,, |
| Water... ... ... ... ... | 1850 ,, |

mixed together and filtered.

Seventy parts of pure bay oil and 200 parts of Cachaca essence are dissolved in 10,000 parts of 95 per cent. alcohol, and mixed, by frequent shaking, with 3000 parts of triple concentrated rose water and 3000 parts of water. When intimately mixed, the whole is left at rest for one to two days, and then filtered. An inferior quality may be prepared by replacing the rose water with water.

One kilo of 95 per cent. spirit is mixed with 14 grams of bay oil, the mixture being left for fourteen days, and then incorporated with 2 kilos of Jamaica rum.

A mixture is compounded of 200 grams of 95 per cent. spirit, 200 grams of water, 1 gram of bay oil, 10 drops of pimento oil, and 1 drop of clove oil, and is filtered after standing several days.

One kilo 100 grams of 95 per cent. spirit, 4 grams of warm water, 30 grams of Venetian soft soap dissolved in 460 grams of warm water, 60 grams of Jamaica rum essence, 6 grams of bay oil, 4 grams of clove oil, 30 grams of absolute alcohol, and 1 gram of cinnamon oil, form another mixture.

According to Fr. Toellner, a fine glycerin preparation can be compounded by dissolving 0·4 of heliotropin, 0·5 of ionone solution, and 3 drops of rose oil in 25·0 of 95 per cent. alcohol, filtering, and mixing the filtrate with 1000·0 of chemically pure glycerin.

### SOAP ESSENCE

The most suitable soap for preparing soap essence is found to be white olive-oil soap, the potash in which plays a useful part in the preparation of these essences for cosmetic purposes. The principal formula is:—

White olive-oil soap, 200 parts; 80 per cent. alcohol, 1000 parts; pure potassium carbonate, 12 parts. The soap is dissolved in the alcohol by agitation in a wide-mouthed flask over a water bath, and the potassium carbonate is added to the solution, which is then slightly coloured—with safranine or rosaniline—and scented. The whole is left to settle for a few days, and afterwards filtered. A very fine scent is prepared by mixing 10 parts of vanilla tincture, 20 parts of violet-root tincture, 20 of rose extract, and 50 of orange-flower extract.

Rodiguet recommends for the preparation of these essences:—

White soap, 1 part; 85 per cent. alcohol, 3; distilled water, 1 part. And for hygienic purposes, the following mixture, which lathers copiously with water:—Olive-oil soap, 20 parts; distilled water, 30 parts; 60 per cent. alcohol, 60; potash, 1 part; and scent, 1 per cent.

To this class belong also the so-called scent essences. For these, spirit of wine is recommended; corn spirit, if used at all, requires to be free from fusel oil, and to be filtered through a mixture of equal parts of washed bone black and levigated chalk. The finished mixture only acquires its full aroma after storage for some time, and will be improved by distillation at the lowest possible temperature over the water bath.

A preparation closely resembling true eau de Cologne can be compounded from the following recipe:—

Siam benzoin, 66 grams; lavender oil, 133 grams; rosemary oil, 66 grams; neroli oil, 350 grams; petit grain oil, 350 grams; cedrate oil, 350 grams; Portugal oil, 700 grams; bergamot oil, 700 grams; French oil of geranium rose, 60 grams; 95 per cent. alcohol, 140 litres. The ethereal oils are dissolved in the spirit in the order given above, the finely powdered Siam benzoin being added last. After the mixture has been left to stand for at least four weeks, with repeated shaking, it is placed in a still along with a corresponding quantity of water, and 135 litres are collected, after rejecting about 2 litres of first runnings. The distillate is left to stand another month in dark-coloured glass vessels in a dark place, and is then ready for filling into bottles for use.

The preparation of soap scents, for supplying small soapmakers, ought to be a very profitable branch of the manufacture of cosmetics. A few recipes for this purpose are given below, the figures quoted referring to grams, and the total quantities sufficing for 1 cwt. of soap:—

For Marshmallow soap.—Lavender oil, 50; clove oil, 30; cassia oil, 30; ginger-grass oil, 40; Peruvian balsam, 120; tolu tincture, 70.

For Herb soap.—Marjoram oil, 20; Curomoji oil, 25; curly-mint oil, 20; sage oil, 20; rosemary oil, 30; calmus oil, 15; caraway oil, 80; lavender oil, 80; clove oil, 20.

For Clove soap.—Lemon oil, 25; cassia oil, 25; santal-wood oil, 25; cedar-wood oil, 25; clove oil, 200.

For Cinnamon soap.—Lavender oil, 50; clove oil, 30; lemon-grass oil, 40; cassia oil, 250.

For Vanilla soap.—Peruvian balsam, 80; clove oil, 40; lavender oil, 40; palmarosa oil, 30; vanilla tincture, 250; benzoin tincture, 150.

For Geranium soap.—Palmarosa oil, 100; African geranium oil, 100; lavender oil, 30; cedar-wood oil, 30; turpentine, 40.

For Eau de Cologne soap.—Lavender oil, 50; rosemary oil, 40; Portugal oil, 160; lemon oil, 50; lemon-grass oil, 40.

For Balsam soap.—Nutmeg oil, 10; palmarosa oil, 40; clove oil, 25; cassia oil, 20; Peruvian balsam, 200; benzoin tincture, 50.

For Windsor soap.—Lavender oil, 100; caraway oil, 75; rosemary oil, 50; oil of thyme, 25; lemon-grass oil, 40.

Mention should also be here made of the preparation of Quillaya-bark tincture—from 1 part of Quillaya bark cut into strips, and 5 parts of dilute alcohol. Dieterich, however, states that the extraction of the bark is incomplete except when an excess of water is employed, and he therefore recommends the following improved recipe:—

| | |
|---|---|
| Quillaya bark ... ... ... ... | 1 part. |
| Water ... ... .. ... ... | 4 parts. |
| 90 per cent. alcohol ... ... ... | 1 part. |

### COSMETIC POMADES

The care of the skin leads to a good demand for cosmetic preparations, especially in the cold season. Cold, damp winds, low temperature, and the widespread neglect to dry the hands thoroughly after washing, cause the skin to take cold in many ways, the effects being recognised by brittleness and chapping.

In addition to petroleum jelly and glycerin, lanolin is a substance that has made its way on to nearly every toilet table; and as this preparation is now obtainable ready packed by makers of cosmetics, many of them have abandoned the production of lanolin crème, although this is a more profitable venture, and the sale can be largely increased by employing perfumes to suit the current taste.

A lanolin toilet cream, prepared according to the following formula, will rapidly gain favour under all circumstances:—

| | |
|---|---|
| Anhydrous lanolin (Norddeutscher Wollkaemmerei) ... ... ... ... | 650 grams. |
| Peach kernel oil ... ... ... | 200 ,, |
| Water ... ... ... ... ... | 150 ,, |

This may be scented with about 15 drops of ionine, or 20 drops of synthetic ylang-ylang (Schimmel).

The so-called lanolin milk, prepared in the following manner, is also highly appreciated:—

| | |
|---|---|
| Anhydrous lanolin ... ... ... | 100 grams. |

melted and mixed with

| | |
|---|---|
| Glycerin ... ... ... ... | 100 ,, |
| Water ... ... ... ... | 750 ,, |

the whole placed in a wide-necked vessel, and to it added, with continued energetic shaking—

| | |
|---|---|
| Benzoin tincture ... ... ... | 50 grams. |
| Gum mucilage... ... ... ... | 30 ,, |

finally scenting the preparation as in the case of the cream.

The glycerin gelées have the advantage over lanolin of being more economical; but, on the other hand, are attended with the drawback that they are less readily absorbed by the skin. These preparations are packed either in glasses or tubes, the latter being preferable, and more and more popular, on account of their greater handiness.

The following is a good recipe for such glycerin gelées:—

| | |
|---|---|
| Finest white tragacanth powder ... ... | 50 grams. |

mixed with

| | |
|---|---|
| Alcohol ... ... ... ... | 100 ,, |
| Glycerin ... ... ... ... | 200 ,, |

shaken up with a suitable amount of perfume, and then quickly incorporated, by shaking, with

| | |
|---|---|
| Water... ... ... ... ... | 650 grams. |

This forms a transparent mucilage, which can be filled into bottles, etc., at once.

The reduced consumption of egg yolks, owing to the introduction of the chrome tanning process on the one hand, and the largely heightened demand for egg albumin for the preparation of albuminised paper on the other, induced Bernegau to seek new methods of utilising the former article, egg yolk. He succeeded in applying this material to the manufacture of cosmetics, and in this connection remarks that he ascertained the capacity of yolk of egg for being rapidly absorbed by the skin, by massage experiments on his own hands, and found beneficial results from the operation. After numerous trials, he recommends the following as the best method of preparing a toilet cream from the aforesaid ingredient, and it undoubtedly forms a profitable article:—Preserved yolk of egg, 1 part; benzoinated olive oil, 1 part; alapurin, 1 part, scented with rose oil or with cumarin and violets, are worked up to a toilet cream to which the inventor has given the name Viteline Crême. This cream is specially adapted to the preparation of excellent toilet soaps, which it renders extremely soft and tractable. It has a beautiful yellow colour, and, apart from its good properties as an emollient for the skin, it is also calculated to achieve a good reputation as a cosmetic for the hair. Alapurin may be replaced by any other preparation of wool fat, or by petroleum jelly; and boroglycerin may be substituted for the benzoinated olive oil.

Camphorated petroleum jelly ice, an appreciated toilet article, is prepared from—

| | |
|---|---|
| Coarsely powdered camphor ... ... | 2 grams. |
| Paraffin ... ... ... ... | 2 ,, |
| Glycerin ... ... ... ... | 2 ,, |
| White wax ... ... ... ... | 5 ,, |
| White petroleum jelly ... ... ... | 8 ,, |

The paraffin, petroleum jelly, and wax are melted together, the camphor being dissolved in this mixture (by warming, if necessary), and the glycerin incorporated by stirring until cold.

A brilliant transparent pomade may be prepared from the following recipe:—

270 grams of perfectly pure tallow, free from water, are weighed out and melted along with 120 grams of pale

resin, and heated to 87·5° C. Then 160 grams of 38° caustic soda lye are heated to 75° C., mixed with 300 grams of 92-94 per cent. alcohol, and the alcoholic soda mixture stirred into the fat, a large vessel used in order to prevent the mass overflowing. A kind of transparent soap is produced. Another method of attaining the same end is to weigh out 8000 grams of East Indian castor oil, 3000 grams of Cochin cocoanut oil, 5000 grams of olive oil, and heat them to 75° C. The above soap is heated along with 4000 grams of 96 per cent. alcohol until bubbles cease to rise, whereupon the two—oil and soap solution—are well stirred up together, coloured with gamboge dissolved in alcohol, and the pomade scented with any desired perfume.

A new recipe for preparing cold cream without stirring has been proposed by Idelson, and is said to furnish a particularly white, very homogeneous, and stable preparation. To this end 135 grams of white wax, 75 grams of spermaceti, and 540 parts of white petroleum jelly are melted over a gentle fire, then strained into a warm, wide-necked bottle, and into the mixture is slowly poured a hot solution of 12 grams of borax in 180 grams of rose water and 20 drops of geranium oil, the whole being well shaken up and stored in a cool place.

A lip salve that never turns rancid, and always retains its handsome red tinge, is prepared from—

| | |
|---|---|
| Paraffin ... ... ... ... ... | 80·0 grams. |
| Petroleum jelly ... ... ... ... | 80·0 ,, |
| Alkannin ... ... ... ... | 0·5 gram. |
| Bergamot oil ... ... ... ... | 1·0 ,, |
| Lemon oil ... ... ... ... | 1·0 ,, |

Scurf pomade.—The following recipe is recommended:—

| | |
|---|---|
| Bensoinated lard ... ... ... | 120 parts. |
| Precipitated sulphur ... ... ... | 4·9 ,, |
| Lanolin ... ... ... ... | 20 ,, |
| 90 per cent. alcohol ... ... ... | 20 ,, |
| Salicylic acid ... ... ... ... | 1 part. |
| Geranium oil ... ... ... ... | 1 ,, |
| Rose water ... ... ... ... | 60 parts |

In connection with the care of the hair, mention may here be made of the recipes for preparing China pomade and cantharides pomade.

China pomade—

| | |
|---|---|
| Beef marrow ... ... ... ... | 335 grams. |
| Lard ... ... ... ... ... | 225 ,, |
| Oil of sweet almonds ... ... ... | 55 ,, |
| Peruvian Balsam ... ... ... | 3 ,, |
| Quinine Sulphate ... .. ... | 3 ,, |
| Clove oil ... ... ... ... | 7 ,, |
| Rose essence .. ... ... ... | 30 drops. |

Cantharides pomade—

| | |
|---|---|
| Beef marrow ... ... ... ... | 900 grams. |
| White wax ... ... ... ... | 100 ,, |
| Mace oil ... ... ... ... | 3 ,, |
| Clove oil .. ... ... ... | 3 ,, |
| Rose essence, or geranium oil ... .. | 30 drops. |
| Cantharides tincture ... .. ... | 28 ,, |

As an appendix to these preparations come the wax pomades, beard pomades, bandolines, and brilliantines:—

### POMADE FIXATEUR A LA ROSE

is prepared in the following manner:—

| | |
|---|---|
| Gum arabic ... ... ... ... | 1 kilo. |
| Soap ... ... ... ... ... | 1 ,, |
| Wax ... ... ... ... .. | 2 kilos. |
| Rose water ... ... ... ... | 2 litres. |
| Bergamot oil ... ... ... ... | 20 grams. |
| Lemon oil ... ... ... . | 100 ,, |
| Oil of thyme ... ... ... ... | 10 ,, |

The gum and soap are dissolved in the rose water, the ethereal oils being then added, followed by the wax, and the liquid is stirred until set. This pomade is also coloured, three kinds being prepared, namely, blonde (uncoloured), brown, and black. The brown is produced by an admixture of umber or terra di Siena, and black by ivory black. The colours must be ground to an extremely fine state of division with oil, stirred up with wax, and added to the other ingredients. The resulting wax pomades are fairly hard; when the weather is cold, they may be softened to the requisite degree by holding the vessel in the hand for a short time.

### STICK POMADE

This is a wax pomade which differs from the foregoing mainly in being merely rather more solid. It is usually prepared in the form of sticks, of circular or oval section, wrapped in tinfoil, and coloured and scented to taste. The usual kinds are white (uncoloured) pomade for light blonde hair; rose-red, coloured with carmine; brown, coloured with umber; and black, prepared with ivory black. The colours are always ground in oil. The rose-red pomade is prepared with alkanna root, which is digested for some time with the melted fat. The basis of these pomades consists of—

| | |
|---|---|
| Lard ... ... ... ... | 2 kilos. |
| Talc ... ... ... ... ... | 6 ,, |
| Wax ... ... .. ... ... | 3 ,, |

and the consistence can be varied by changing the proportion of wax. They are usually scented with bergamot, lemon, clove, or thyme oil.

### HUNGARIAN POMADE (POMADE HONGROISE)

This is prepared from—

| | |
|---|---|
| Gum arabic ... ... ... ... | 1 kilo. |
| Soap ... .. ... ... | 1 ,, |
| Wax ... . ... ... ... | 1 ,, |
| Rose water ... ... ... ... | 1 ,, |
| Bergamot oil ... ... ... ... | 40 grams. |
| Santal-wood oil .. ... ... ... | 20 ,, |

For brown and black, the pomade is suitably coloured. It is made up into sticks about the thickness of a lead pencil.

### WAX FOR THE MOUSTACHE AND BEARD

| | |
|---|---|
| Turpentine | 1 kilo. |
| Almond oil | 1 ,, |
| Wax | 3 kilos. |
| Violet pomade | 1 kilo |
| Peruvian balsam | 500 grams. |
| Clove oil | 30 ,, |
| Santal-wood oil | 20 ,, |
| Cinnamon oil | 20 ,, |

In preparing bandoline, 400 grams of tragacanth are powdered, placed in 8 litres of rose water, and left in a warm place, with frequent stirring, until the tragacanth has swollen up into a mucilaginous mass. This is then pressed through a coarse cloth, afterwards through a finer one, and finally receives an addition of a little liquid carmine and 20 grams of oil of bitter almonds.

A useful brilliantine is prepared from 4 kilos of glycerin and 21 grams of jasmine—or other extract; also from—

| | |
|---|---|
| Glycerin | 2 kilos. |
| Castor-oil | 2 ,, |
| Bergamot oil | 20 grams. |
| Lemon oil | 20 ,, |
| Neroli oil | 10 ,, |

We will now consider the manufacture of preparations for use against freckles, moles, warts, and sweaty hands:—

### FRECKLE WASH (EAU DE HEBE)

| | |
|---|---|
| Distilled vinegar | 660 grams. |
| Lemons, chopped in fine pieces | 185 ,, |
| 85 per cent. alcohol | 88 ,, |

| | |
|---|---|
| Lavender oil | 28 grams. |
| Water | 88 ,, |
| Cedra oil | 6 ,, |

This mixture is left to stand in the sunlight for three to four days, and filtered. It is applied to the freckled skin with a soft sponge before retiring to rest, and is allowed to dry on.

Another wash for freckles is compounded from—

| | |
|---|---|
| Angelica root | 50 grams. |
| Orris root | 50 ,, |
| Styrax | 20 ,, |
| Bergamot oil | 10 ,, |
| Lemon oil | 10 ,, |
| Alcohol | 2 litres. |

### EAU LENTICULEUSE

| | |
|---|---|
| Potassium carbonate | 200 grams. |
| Sugar | 20 ,, |
| Orange-flower water | 2 litres. |
| Alcohol | 200 grams. |

### LINIONESE I

| | |
|---|---|
| Potassium Carbonate | 400 grams. |
| Water | 2000 ,, |
| Rose water | 400 ,, |
| Alcohol | 200 ,, |
| Rose oil | 10 ,, |
| Cinnamon oil | 5 ,, |

### LINIONESE II

| | |
|---|---|
| Rose water | 2 litres. |
| Orange-flower water | 1 ,, |
| Glycerin | 500 grams. |
| Potassium carbonate | 100 ,, |
| Benzoin tincture | 26·50 ,, |

The quantity of the alcoholic benzoin tincture used is just so much as is required to make the liquid opalescent or slightly milky.

The following recipe is said to furnish a reliable wash for removing freckles:—

A solution is prepared of dilute nitric acid, 7 grams; eau de Cologne, 115 grams; and neroli oil, 10 drops; to which is added, hydrogen peroxide, 60 grams; glycerin, 100 grams; cochineal extract, 3·5 grams; and enough distilled water to make 325 grams. It is then left for a fortnight before filtering. The preparation is applied with a linen rag after the face has been washed, and is allowed to dry on.

## MOLES

The best remedy for these is hydrogen peroxide, a piece of cotton-wool, soaked in this liquid, being laid on the mole for five minutes, morning and evening; the resulting irritation and scaling of the skin are counteracted by rubbing with lanolin or by coating with a solution of borax and glycerin. Consequently, the manufacturer of cosmetics has to make two preparations for curing moles, namely, hydrogen peroxide and a lanolin pomade. The method of application should be printed on the wrappers of both. The hydrogen peroxide must be filled into opaque bottles and labelled somewhat as follows: "Moisten a pad of cotton-wool with this liquid, and apply the same on the mole, morning and evening, five minutes at a time." The lanolin pomade should be labelled: "After the mole has been moistened with the liquid for five minutes, a little of this salve should be rubbed on the spot."

**WARTS** may be eliminated in a simple and reliable manner by the use of formalin,—40 per cent. formaldehyde,—a piece of stick being steeped in this liquid and rubbed well into the wart. The operation is said to be painless, except where cracks occur in the flesh, when a temporary smarting is produced. After two or three applications, the wart will begin to shrink, and will fall off without leaving any scars. The cosmetic manufacturer could therefore also sell formaldehyde solution for warts, with printed directions on the bottle, and perhaps supply a suitable wooden instrument as well.

Another remedy for warts, also exhibiting the advantage of not leaving any scar behind in addition to being painless, has been proposed by Convel-Dubregyré. This preparation can also be made up by the cosmetic manufacturer in fancy packages, with directions for use. It consists of a solution of potassium bichromate in hot water; on cooling, this deposits crystals, and the supernatant liquid is applied to the warts with a brush, once or twice a day.

A remedy for SWEATY HANDS—a much-sought preparation—is furnished by the following mixture, and finds a ready sale:—

Borax, 4·0; salicylic acid, 4·0; boric acid, 1·0; glycerin, 16; alcohol, 16·0. The solids are dissolved in the spirit, the glycerin being added afterwards. The preparation is used for rubbing into the hands three to four times a day.

A proved remedy for the smell of perspiration, capable of easy preparation and direct use, is the following:—A 10 per cent. solution of lead acetate is treated with 50 grams of calcined magnesia, and applied externally.

For protecting the hands against the action of caustic or corrosive antiseptics, the following precautions may be adopted:—

Carbolic acid and corrosive sublimate make the skin brittle and cracked when frequently brought in contact therewith, even in the case of dilute solutions. Washing with water is not sufficient to cleanse the hands thoroughly. After carbolic acid, the best thing to wash with is alcohol, a solution of common salt being the best after corrosive sublimate; a thoroughly good soaping is advisable in either case, and a spoonful of borax should be rubbed in with the soap lather. After the hands are dry they should be rubbed over with a little lanolin.

Disagreeable smells, such as those from iodoform, creosote, or guaiacol, can best be removed by washing with linseed meal or mustard meal and water. The smell of iodoform, in particular, can be easily removed by rubbing the hands with ergot powder and water. Ground coffee, oil of turpentine, tar water, and ethereal oils are also recommended for this purpose. When the hands are dry, they should be dusted over with powdered talc, renewed every hour, in order to prevent eczema, which frequently results. Chapping of the hands, so often occurring in winter, may be prevented by rubbing them with a mixture of glycerin and rose water, or glycerin, boric acid, and petroleum jelly. For healing cracks and chaps, the following salve is recommended:—Menthol, 0·75; salol, 1·5; olive oil, 15·0; lanolin, 45.0.

Particulars have already been given for preparing a rightly appreciated preparation of crushed almonds, but it differs from the one now subjoined, namely:—Crushed almonds, 5 parts; siliceous earth, 6 parts; potato starch, 5 parts; glycerin, 2 parts; violet root, 1 part, borax, 2 parts; talc, 1 part Oil of bitter almonds or nitrobenzol is employed as the scent. Another, but less useful, preparation for the same purpose is the following:—Calcined soda, 50 grams; powdered borax, 100; finest violet-root powder, 250; and 2000 of finest wheat flour or rice meal, are mixed, and with the mixture are incorporated 120 of fatty almond oil. Finally, 100 grams of alcohol and about 50 drops of oil of bitter almonds are added, and the whole is rubbed through a fine hair sieve

### PLAISTERS

The paper plaisters, first described by Redoin, are also highly suitable for cosmetic purposes. This author has given the following recipes:—

Salicylic acid plaister.—The paper is dipped in a mixture of salicylic acid, 1 part; paraffin, 50; and liquid paraffin, 50 parts.

Sublimate plaister.—Blotting paper—not satin paper —is steeped in a solution 2·5 parts of corrosive sublimate in 1000 of spirit, or saturated with a hot solution of 2 parts of sublimate in 1000 of water and 50 of glycerin, and then hung up to dry.

Styptic plaister.—Satin paper is steeped with a solution of 1 gram of alum in 18 grams of ferric chloride solution. When blotting paper is used, a hot solution of aluminium sulphate, 2·0 parts; burnt alum, 1; benzoic acid, 1; ferric chloride solution, 6; and distilled water, 4 parts, is employed.

Antiseptic sticking plaister.—A substitute for diachylon plaister can be prepared from satin paper steeped in the following solution:—Salicylic acid, 1 part; gum arabic, 45; distilled water, 55 parts.

The paper used for the foregoing is of the kind generally known as cigarette paper.

The author, being interested in the preparation of an antiseptic sticking plaister as a substitute for diachylon plaister, has worked out a process for making this on the large scale. The solution used for this purpose is that just mentioned, consisting of salicylic acid, gum arabic, and distilled water. The salicylic acid is dissolved by warming the water, and when this is accomplished the gum arabic is brought into solution This solution is very viscous on account of the high percentage of gum, but it is not clear, nor is it necessary that it should be so.

Redoin, in his directions, speaks of steeping and impregnating the cigarette paper in the solution. This, however, is not feasible in the general acceptance of the term, the solution being too concentrated to penetrate the paper sufficiently. Moreover, paper plaister prepared in this way would be as sticky on one side as the other, which would render the application of the plaister well-nigh impossible, and certainly would not fit it to replace diachylon plaister. In addition Redoin's directions are attended with a further important drawback, namely, that in consequence of the large proportion of gum present—which, however, is essential—the paper, on drying, becomes brittle and liable to crack, so that it is difficult to cut it into strips or small pieces for application to wounds, etc., and therefore the plaister is practically unsaleable.

However, the author has found a way to obviate all these inconveniences, and has succeeded, by a very simple means, in producing an antiseptic sticking plaister of faultless outward appearance, with a brilliant gloss on the side applied to the skin. It can be cut into pieces of any size, has been pronounced by all who have seen it a perfectly saleable article, and has proved, in use, capable of practically replacing the more expensive diachylon plaister.

In making this article, the above-named solution is mixed thoroughly with about 2-3 grams of concentrated, water-white glycerin, which renders the paper soft, supple, and very glossy. The glycerin, being hygroscopic, produces a welcome softness, and makes the paper handle well; the sheets can be bent in any direction, folded, cut, torn; in fact, one can do anything with it, and it never gets glassy, brittle, or cracked.

Care, however, is necessary not to overdo a good thing, since, if too large an amount of glycerin be taken, its hygroscopic properties become unpleasantly apparent, the paper refusing to dry, with the result that, when two sheets are laid together, they cannot be separated without tearing.

So far as the steeping of the paper is concerned, the method adopted, as the result of practical experiments, is as follows:—The solution is placed in a porcelain basin, the sheet of cigarette paper is spread out on a board, and the solution is applied to the one side with a broad flat brush. In winter, the uniformly coated sheets are placed to dry near a stove, but in the summer are merely exposed to the air. Drying ensues in a very short space of time, and as soon as this is accomplished the sheets can be cut to the proper size for packing.

This paper when moistened possesses great adhesive power, and when applied to the wound, etc., to be protected, never stretches or tears in drying. Being glossy only on the sticky side, it is easy to tell which side should be moistened for use.

## FUMIGATING PAPERS

are strips of paper impregnated with substances that give off an agreeable aroma when heated, so that by merely placing a strip of such paper on a hot stoveplate, or holding it over a flame, the entire atmosphere of a room can be scented.

These preparations are divided into two classes: such as are burned, and such as are used more than once. In making the former, the paper is impregnated with a solution of saltpetre before the perfume, whilst the other papers are rendered incombustible by steeping with a hot solution of alum, in consequence of which they merely carbonise and do not burn, even when strongly heated.

The following recipes will be found suitable for making these preparations, which have only a slight relationship with cosmetics properly so called:—

The paper is treated with a solution of 100-150 grams of saltpetre in water, and when dry is repeatedly immersed in a strong solution of benzoin or incense, being dried after each immersion.

An excellent fumigating paper may be prepared from the following recipe:—

| | |
|---|---|
| Benzoin ... ... ... ... | 150 grams. |
| Santal wood ... ... ... ... | 100 ,, |
| Incense ... ... ... ... | 100 ,, |
| Grass oil ... ... ... ... | 10 ,, |
| Essence of betiver ... ... ... | 50 ,, |
| Alcohol ... ... ... ... | 1 litre. |

For use, the paper is placed in contact with a glowing—not burning—substance, whereupon it immediately ignites without flame, but throwing off brilliant sparks, and diffuses an agreeable perfume.

Another recipe is: Cinnamon oil, 4·0; powdered nutmeg, 4·0; liquid styrax, 4·0; gum benzoin, 4·0; ambergris, 0·3; musk, 0·3. Sufficient alcohol is added, by drops, to form a somewhat fluid mass, which is applied with a large soft brush to one side of a piece of fine paper, the latter than laid between oil or wax paper. For use, the impregnated paper is held over a flame, so that it merely smokes without taking fire; thus treated, it disseminates an agreeable perfume, and can be set aside for use several times over.

Incombustible fumigating paper is prepared by dipping the paper in a hot solution of 100 grams of alum per litre of water, and then impregnating it with the following mixture:—

| | |
|---|---|
| Benzoin ... ... ... ... | 200 grams. |
| Tolu balsam ... ... ... ... | 200 ,, |
| Tonka bean essence ... ... ... | 200 ,, |
| Betiver essence ... ... ... ... | 200 ,, |
| Alcohol ... ... ... ... | 600 c.c. |

When warmed, this paper diffuses a very agreeable perfume, and can be used a number of times over. It will not ignite, but merely carbonises, even when strongly heated. Some makers produce inferior qualities of these articles by simply dipping the paper, prepared with alum, into melted benzoin or incense.

### SUNDRY PREPARATIONS

Mention may here be made of a number of cosmetic preparations that are in common use in this country:—

Rose Bandoline.—Tragacanth, 52 parts, and rose water, 950 parts, are digested in a close vessel for a couple of days at a gentle heat. The mixture is strained, and scented with rose oil; or 1 part of quince seeds is macerated with 40 parts of rose water for several hours, with frequent stirring, and scented with rose oil or other ethereal oil after straining.

Crême de Mauve.—One part of glycerin is mixed with 1 part of alcoholic extract of jasmine, and coloured with a little fuchsine. This preparation is used to impart gloss to the hair.

Oleolisse Tonique de Piver.—Five parts of castor oil are dissolved in 15 of alcohol, and scented with bergamot oil or Portugal oil.

Laurel Tincture, artificial Bay Rum.—Tincture of laurel leaves—1 :10—186 parts; laurel oil, 4; borax, 30; ammonium carbonate, 30; rose water, 950 parts.

Extrait Végétal.—Vanilla essence—1 part of vanilla, 30 parts alcohol; 2 parts of orange-flower extract; 1 part each of jasmine extract, rose extract, and tuberose extract; alcohol, 16; rose water, 20 parts.

Amandine.—A syrup is prepared from 2 parts of sugar and 1 of water: 16 parts of this syrup are mixed with 4 parts of almond-soap crême until homogeneous, and into this is stirred 400 parts of almond oil scented with 4 parts of oil of bitter almonds, 4 of bergamot oil and clove oil. The mixing of the almond oil with the syrupy mass entails a certain amount of skill; and some force is required, especially towards the end, as the mass gets stiffer.

Almond-Soap Crême.—This is prepared by melting 500 parts of pure fat and mixing the same with 200 parts of a 25 per cent. solution of caustic potash, the latter being added very slowly and with continued stirring, which is continued until the mass is cold, whereupon it is triturated in a mortar with 12 parts of alcohol and 1 of oil of bitter almonds until frothy and homogeneous.

Almond Paste.—Thirty-two parts of blanched bitter almonds are triturated to a fine paste, to which is gradually added an intimate mixture of honey, 60 parts; yolk of egg, 30; almond oil, 60; bergamot oil, 1; and clove oil, 1.

Milk of Roses.—Castile soap is dissolved in 4 parts of rose water by the aid of gentle heat, whereupon 1 part of white wax and 1 of spermaceti are added to the solution; when these are melted, a strained mixture, compounded of 16 parts of blanched sweet almonds and 1000 parts of water, is added by degrees and with constant stirring. Finally, 150 parts of alcohol and 8 of rose oil are incorporated with the mixture.

Frangipani Sachet powder.—Violet-root powder, 1500; patchouli leaves, 120; santal wood, 120; neroli oil, rose oil, santal-wood oil, 2 parts of each; powdered musk sac. 10; and civet, 5 parts.

# COSMETICS

## CHAPTER I

### PURPOSES AND USES OF COSMETICS, AND INGREDIENTS USED IN THEIR PREPARATION

THE subject of cosmetics is closely allied to perfumery; but whilst the latter deals merely with the more external question of the dispersion of odour and aroma, and the masking of less pleasant smells, the domain of cosmetics is more of an internal character.

True, the two often join hands, as it were, and in many points it is difficult to maintain the line of demarcation between the two terms. This is particularly the case where it is a question of methods of preparation, application, and ingredients bordering on the domain of medicine. Here perfumery exhibits a certain independence, though not always to its advantage or repute; since in many instances preparations are made and sold which really belong almost entirely to the department of medicine, but contain substances either in themselves poisonous or else capable of producing injurious effects on the human organism by protracted use.

When rationally practised, the art of cosmetics should, however, be the means of preventing such encroachments, proving by critical analysis that such and such ingredients are worthless, and contain nothing capable of producing the effect in view; or that the means proposed for a given purpose contain substances either prejudicial or directly inimical to health; and indicating means and ways for attaining the desired aim without the slightest detriment to health.

Thus the cosmetic art is primarily of hygienic importance. In this connection its task is to assist medicine in a friendly manner, and not to oppose the same. It should, by the means at its disposal, support and assist the functions of certain parts of the human body, protect them from injury, and remedy injuries already existing. This, however, is possible only when all the materials employed have been carefully tested in order to ascertain whether they are actually capable, by their nature and properties, of exerting a certain definite action, and seem to be unobjectionable from a hygienic point of view.

Furthermore, the art of cosmetics plays the part of an impartial adviser to the laity, whose confidence it enjoys in certain matters dealing with the care of the body; it opens and points the way for those engaged in the manufacture of cosmetic preparations; and, finally, constitutes a link in the chain of hygienic regulations, inasmuch as, in its capacity as a branch of hygienic science, it endeavours to remove or frustrate everything that is contrary or injurious to health.

The second task to be performed by cosmetics may be regarded as of an æsthetic character, namely, the beautifying of certain parts of the body. Even in this case, however, the main point of hygiene cannot be put out of sight; and this, indeed, is the crux which forms the stumbling-block of many thousands of ignorant or intentional deceivers, who, in their eagerness for profit, disregard the question whether what they offer the public may be detrimental to health.

Consequently, when the rational art of cosmetics deals also here with the analysis and testing of the means proposed, employed, or destined to be employed, for the beautifying of certain parts of the body, it not only fulfils its hygienic mission, but is also at the same time explanatory and instructive.

Then, again, the third task of our subject is instructive as regards the elucidation and valuation of old and new preparations, and the proper means of producing suitable beautifying preparations.

The entire domain of cosmetics, in all three respects mentioned, is concerned with the rational care of the skin, the hair, the teeth, and the mouth. Moreover, it is not merely restricted to the indication of means capable of attaining the end in view, but also points and elucidates the manner in which those means can be prepared.

The rational care of the skin, hair, teeth, and mouth constitutes an important task, owing to the fact that the maintenance of these organs in a fit state to discharge their functions as they should be, is a fundamental condition for the health of the individual. At the same time, the æsthetic importance of the matter should be by no means despised, the progress made by chemistry having placed at disposal numerous means capable of furnishing successful results, without the slightest danger to health.

The art of cosmetics, however, will not attain its full repute and the complete appreciation of its importance, until it has been freed from the dross still adhering to it from times long past; until it takes its position as an independent technology; and never leaves out of sight—in its methods and the selection of materials—the hygienic mission with which it is charged. It will then also occupy the position of an assistant to medicine and a profitable patron of the art of perfumery.

Meanwhile it must not be forgotten that the need for cosmetic appliances has not arisen merely in our own times; on the contrary, this need extends backward to the earliest ages, and, moreover, is manifested among peoples whose standard of civilisation would not lead one to suppose such to be the case. The cosmetic art of the present day, however, differs in the manner in which this need can be supplied, by the practical application of the progress of science to the production of cosmetic preparations, by rational processes and reliable ingredients, from that of older times, wherein chance, prejudice, ignorance, and even superstition were all convoked.

## INGREDIENTS USED IN THE PREPARATION OF COSMETICS

To a certain degree the preservation of scent and aroma is at least as important as the preservation of bodies occupying space and possessing form; but, in consequence of the extraordinary volatility of the first named, is an exceedingly difficult task. Moreover, the external effect of scents and aromatics resides entirely in this volatility, which, besides, affords the sole means whereby their presence can be detected in association with other substances.

On the other hand, the retention of these readily vanishing products is one of the chief tasks of the cosmetic art, and the practitioner of this art must attempt to impart to his products a certain permanence and durability, despite the natural difficulties with which he is here confronted.

In the preservation of foodstuffs, wood, and metal, the conditions are, in some respects, simpler, it being for the most part merely a question of preventing decomposition, from internal or external sources, by the addition of suitable antiseptics, in the case of wood or foodstuffs; in metals, external influences alone have to be guarded against; whereas in preserving scent and aroma, the only point under consideration is the binding and fettering of the volatile substance.

The methods of preparing scents are various; and the choice depends, not merely on the properties of the raw material from which the scent is to be recovered, nor on the yield and profit attainable, but more particularly on whether the scent can be obtained in a pure state, and free from all extraneous admixtures capable of injuriously affecting its purity in any way.

The methods employed for the recovery of scents are: pressing, distillation, maceration, absorption, and, finally, extraction. Before proceeding to deal with these various methods and the details of their performance, it will perhaps not be devoid of interest and practical utility to regard them critically, and ascertain how they have behaved in practice. The practical man will then be in a position to compare them with his own experience, and thus recognise whether his own methods are rational or not.

On a small scale, the method of winning perfumes by pressure suffers from the drawback that, even when the strongest screw presses are used, a considerable portion of the oil is lost owing to a very large number of the oil vessels in the shells remaining unbroken. For this reason it is always advisable to employ hydraulic presses, since these give an amount of pressure unattainable by other means. Hence this method is out of the running for workers on the small scale. Furthermore, it is merely of low value to the maker of cosmetic preparations, being only suitable for application to a few substances yielding cheap scents. The employment of a hydraulic press is only profitable for working on the large scale, and especially for the production of various fatty oils (which, besides, are frequently used in compounding cosmetics).

The distillation method is extensively practised, and is capable of application to a large number of substances, such as the ethereal oils present in caraways, aniseed, lavender, mace, fennel, nutmegs, cinnamon, etc., all of which are obtained by this means.

Though suitable forms of apparatus exist for the performance of this method on the small scale, for those who are unprovided with a steam boiler, and are obliged to use fire-heat, nevertheless the products for the most part do not come up to the high standard of purity now required. In fact, steam distillation is indispensable for working on the large scale, which latter is the only profitable way of conducting these operations. Despite sundry "ifs" and "buts," the distillation method must always be retained, more especially for dealing with vegetable matter rich in scented constituents, or voluminous in bulk, and with woods. On the other hand, distillation is not recommended for working on the small scale, or where very fine perfumes are in question.

The maceration process, which is chiefly practised in France, is based on the property of fatty substances of absorbing perfumes with avidity, and of parting with a large proportion of same when treated with very strong alcohol. According as the maceration of the flowers is effected by the aid of fats of high or low melting point, the products are classed as pomades or scented oils. By using the same fatty matter for repeatedly treating fresh quantities of flowers, the manufacturer has it in his power to perfume the pomade or oil to any desired extent. These products are indicated by numbers, the higher numbers expressing the stronger products. Fats may be advantageously replaced for this purpose by glycerine, which also absorbs the perfume from the flowers in a very rapid manner.

The first point to be mentioned in connection with this method is, that however long the fat is exposed to the action of alcohol, the extraction of the perfume remains incomplete, a small portion beings always left behind. True, these residual perfumed fats and oils can be sold as such; but this circumstance is immaterial so far as concerns the appreciation of the value of the method, the point at issue being to determine whether the method attains the object for which it is employed, namely, the complete and pure extraction of the perfume. In addition, it must be remembered that some vegetable perfumes are unable to stand even the slight increase of temperature entailed by the maceration process.

A modification of the maceration method consists in treating the flowers with fats or oils at the ordinary temperature, and is known as "enfleurage." Again, fat may be replaced by carbon dioxide for this purpose; but this treatment, which is troublesome and lengthy, exhibits no special advantage, except perhaps in the avoidance of high temperatures.

The extraction method is based on the capacity exhibited by certain volatile liquids, such as sulphuric ether, chloroform, petroleum ether, and carbon disulphide, for quickly extracting the perfumed constituents from flowers, and then leaving the extractives behind in a pure state when themselves evaporated by the application of heat.

This method offers the undeniable advantage of being equally useful for working on the small scale as the large; and this is a point worthy of mention. It is, however, attended with the inconvenience of having to get rid of the solvent after the latter has performed its allotted task, and become merely a source of trouble. True, the solutions of perfume in such solvents can be volatilised at a very low temperature, and the solvents themselves can be recovered in the condenser for use over again; but the method does not preclude the volatilisation of the perfume, and its alteration by the action of atmospheric oxygen, even when the temperature of 36° C. is employed in the case of sulphuric ether, 65° C. with chloroform, 50° C. with petroleum ether, and 46° C. with carbon disulphide.

It is thus evident that each method is defective; and, in fact, there is really no method known which could be characterised as the best, and most commendable for use in all cases. This is probably the reason why attempts are continually made to increase the production of perfumes by artificial means, *i.e.*, the synthetic process.

Endeavours were made for a long time to isolate the perfumes of sweet-scented flowers by using readily volatile solvents in place of the earlier method of impregnating fats and oils with the corresponding perfumes by maceration or enfleurage. These attempts, however, were unattended by any striking amount of success, although the utility of the method is beyond doubt. The chief drawback resides in the insufficiency of the solvents employed, whether owing to the fact that their boiling points are too high to permit the recovery of the extracted perfumes in an unaltered or pure condition, or that a small proportion of the solvent remains obstinately adherent to the extracted matter, its removal then entailing the application of such a high temperature that the perfume suffers alteration. In the year 1891 it was widely stated in the technical press that a solvent free from the aforesaid defects had been discovered in methylal. The low boiling point (42° C.) of this substance, coupled with the readiness with which it volatilised without leaving a trace behind, led to the expectation that it would prove suitable for isolating even the most delicate perfumes; and these hopes were said to have been confirmed by practical experiments, for example, with violet blossoms. Nevertheless, this solvent does not appear to have been fully adopted in practice, no further experiences with it having been made public since that time.

A point specially worthy of mention is the circumstance that in the preparation of perfumes the most divergent gradations can be obtained, often in a surprisingly simple manner. Apart from this, however, entirely new perfumes can be prepared by the mixing and suitable treatment of various components.

Thus it was observed by E. Soxhlet that a mixture of Peruvian balsam with traces of carbolic acid produced the same scent as castoreum; whilst acetic acid and traces of clove oil closely imitate the smell of fresh strawberries. The odour of fresh poplar buds can be easily produced by suitably mixing an alcoholic solution of guaiacum with lavender oil. An alcoholic solution of rose oil with traces of patchouli tincture gives the well-known "white rose." perfume; and rose oil with traces of musk tincture gives moss rose. A close imitation of the scent of lilies of the valley is obtained by mixing ylang-ylang extract with traces of tincture of cardamoms; and elder flower extract is prepared by adding ylang-ylang and linaloe to turpentine oil. Eau de Cologne can be produced by adding 1 gram of neroli oil to 100 grams of alcohol. Every lover of this scent will admit that the product obtained in this manner is superior to all others, and, in fact, when kept for some time it is really excellent, the only objection being that it is more expensive than mixtures prepared from the ordinary recipes, which, in addition to small quantities of neroli oil, contain such oils as lavender, rosemary, lemon, etc. The well-known and highly appreciated handkerchief scent, Ess Bouquet, can be imitated by the following recipe: Jasmine extract, reseda extract, and violet extract, 1000 grams each; orris root, 1500 grams; liquid storax, 5 grams; and ambergris, 2 grams: the whole digested together for a month and then filtered.

English people prefer strong scents, so for this market the flower perfumes are usually strengthened by additions of ambergris, musk, storax, benzoe, cumarin, and patchouli.

A number of new scents have been discovered by chemists, and these are now obtainable so cheaply as to make it worth while attempting to use them in the preparation of extracts and fancy scents. To this class belong heliotropin, cumarin, vanillin, nerolin, terpinol, etc.; and these, when dissolved in alcohol and mixed with a suitable fixing agent, such as musk, ambergris, etc., furnish really excellent and cheap handkerchief perfumes. An excellent heliotrope extract can be prepared from heliotropin by digesting 1 gram of heliotropin, 0·2 gram of vanillin, 3 grams of neroli oil, 1 gram of oil of bitter almonds, 0·1 gram of musk, and 5 grams of benzoin, in 1 litre of alcohol for a month.

It is well known that the addition of just sufficient fresh milk to a solution of ethereal oils as to cause incipient separation of the oil, contributes to the durability and intensity of the perfume of the mixture, the small amount of butter fat in the milk sufficing to retain the aroma, which would be lost by the volatilisation of the alcohol. The effect is still greater when hot milk is used; but it is always necessary to know in advance just how much milk is required to produce the incipient separation of the perfume. Consequently the following method must be adopted:—

The ethereal oil preparation being ready, a small quantity is taken, say about 30 c.c., and placed in a graduated burette, where sufficient water is added—drop by drop towards the end—to produce a distinctly opalescent mixture, without causing the separation of any drops of oil after standing for an hour. It then becomes a question of ascertaining how much milk will be necessary to displace the quantity of water used. Cow's milk contains on the average 80 per cent. of water; then, assuming we have used, in the above case, 15 minims of water (30 c.c. being equal to 1 fluid ounce), it will be necessary to multiply this figure by 1·055 in order to find the quantity of milk required. The multiplier is found in the following manner:—1 fluid ounce (=30 c.c.) of milk weighs about 470 grains (30·4522 grams); and the sp. gr. of milk is 1·030 at 16° C. These 470 grains contain 433·6 grains of water (88 per cent.), and 36·4 (12 per cent.) of solids, the 433·6 grains of water corresponding to 455 minims. Hence we have the sum: $455 : 480 = 15 : 21$; $x = 15 \times 1·055$. In our special case $x$ is equivalent to 15·25; or, in round numbers, 16 minims. To ascertain the weight, instead of the volume, of milk required, all that is necessary is to multiply the volume in minims, etc., by 1·033. (1 pound is equivalent to 12 ounces of 8 drams, of 3 scruples, of 20 grains or minims.)

The various methods of preparing scents will now be described.

# CHAPTER II

## PREPARATION OF PERFUMES

### THE PRESSURE METHOD

THIS method is only applicable to certain perfumes occurring abundantly in various parts of plants. Thus the skins of oranges, lemons, quinces, etc., contain considerable amounts of ethereal oils, enclosed in oil vessels which can be easily detected under the microscope. On subjecting the said parts to powerful pressure, the oil vessels are ruptured and the contents escape. As a rule, the operation is conducted in screw presses, provided with strong iron spindles, the materials being placed in strong press cloths made of horse hair or linen cloth, these being then laid between iron plates and exposed to gradually increasing pressure. Comparative tests have shown that, even when the strongest screw presses are used, a considerable proportion of the oil is lost, through a large number of the oil vessels being left unbroken. For this reason it is always preferable to employ hydraulic presses, since these furnish a degree of pressure unobtainable by any other means. In hydraulic presses for this class of work, the piston or plunger fits exactly in a hollow iron cylinder, which is perforated all round like a sieve, and contains the substances to be pressed. When pressure is applied, the matter expressed from the materials flows through the perforations in the cylinder, leaving the residue behind in the form of a compact cake, which latter is quite free from oil.

The expressed liquid contains an aqueous fluid in addition to the oil, the whole being rendered milky by the presence of vegetable fibres, mucilage, etc. This is collected in a high glass cylinder, which is then set aside in a place where it will be quite free from vibration. After a few hours' rest the liquid will be found to have separated into two layers, the lower one consisting of the water, vegetable mucilage, etc., and the upper one of nearly pure oil. This is carefully decanted and passed through a filter, until perfectly clarified, a double layer of filter paper in a glass funnel covered with a glass plate being used.

A better method of separating the oil and water is by means of a separating funnel, which can be made by cutting the bottom off a bottle and passing a glass tube, about 6-10 mm. in diameter, through the cork. By attaching to this tube a short length of indiarubber tubing, fitted with a pinchcock, this extemporised funnel can be used for separating even the last drops of water from the press runnings.

For the manufacture of cosmetics, the method of extracting perfumes by pressure is of little value, since it is only applicable to a few materials which furnish cheap scents.

### THE DISTILLATION METHOD

The vapours of many perfumes and ethereal oils have the property of being carried away in such quantity by steam that they can be extracted from the parent plant by this means, though as a rule the ethereal oils have a higher boiling point than water. This method of volatilising any substance and then recovering it by condensation is termed steam distillation, and is capable of application to a large number of substances, the ethereal oils contained in caraways, aniseed, lavender, fennel, mace, nutmegs, cinnamon, etc., being obtained exclusively by this means.

The forms of apparatus used in carrying out this method vary in accordance with the amount of material to be treated; and a few of the chief types will now be described.

For those who are unprovided with a boiler, and have therefore to use direct fire heat, an advantageous form of still is one set in brickwork in such a manner that the hot gases from the fire come in contact, not only with the concave bottom of the vessel, but also with the sides by means of flues arranged in the brickwork. The upper part of the still projects above the setting, and is provided, at one side, with an opening fitted with a screw cover, and serving to fill up the still with water whilst distillation is proceeding. A copper or tin hood is fitted, steamtight, over the edge of the still, and terminates in a pipe leading to the condenser, which consists of a coiled tin pipe fixed in a wooden or metal vessel. The latter is provided with an elbow pipe at the top, and with a tube, bent at right angles and debouching immediately over the bottom of the vessel, its length being such that it projects beyond the edge of the vessel.

The materials to be distilled are introduced into the still and suffused with water; it is also advisable to provide the still with stirrers, which can be kept in motion until the water actually boils, since otherwise there is a risk of local overheating and burning against the walls and bottom. Such a risk may also be counteracted by introducing into the still a perforated false bottom, placed above the level of the lateral flues; or by putting the materials under treatment into a wire basket and suspending the latter in the still.

The employment of steam for the recovery of perfumes by the distillation method is highly advantageous, and indeed indispensable for working on the large scale. The stills, which in this case may be constructed of strong tin plate, are unmounted, and are lagged with wood to prevent loss of heat by radiation. Immediately above the concave bottom is fitted a perforated false bottom, on which the charge is laid. A pipe, passing through the bottom of the still, is connected with a boiler supplying steam under low pressure. This steampipe is fitted with a tap, and a second tap serves to run off the water left in the still after the distillation is at an end. When the still is charged, the steam tap is turned on by degrees, and the passage of this current is continued until the operation is complete.

During distillation a mixture of pure water and ethereal oil escapes from the mouth of the condenser. Where the quantities to be dealt with are large, it is advisable to effect the separation of the distilled oil and water by means of a so-called Florentine bottle. This consists of a glass bottle, from the bottom of which an upwardly bent tube projects to such a height that the bend in the tube is on a slightly lower level than the neck of the bottle. During distillation the bottle fills with water, on the top of which floats the separated oil; but when the water reaches a certain level the excess runs away through the bent tube, so that, towards the end, the bottle contains only oil and a very little water.

For work on the large scale this somewhat fragile appliance is replaced by separating bottles consisting of glass cylinders, tapering at the top and bottom, and mounted on a suitable frame. The water settling down below the oil is drawn off through a tap at the bottom; and as soon as the first bottle of the series is full of oil, the liquid coming from the condenser is diverted through a horizontal pipe into the next, and so on.

The complete separation of the oil from water is effected in a separating funnel: a glass funnel, closed by a ground glass plate at the top, and drawn out to a fine point at the bottom of the tapped limb. The contents of the Florentine bottle are transferred to the separating funnel, which is then covered up and left until a clear line of demarcation is observed between the oil and the water. By carefully opening the tap, the whole of the water can be drawn off; the oil is then transferred to bottles, which are fitted with air-tight stoppers, and stored in a cool dark place.

### THE MACERATION METHOD

Certain perfumes, such as those of the acacia, rose, mignonette, orange blossom, violet, and many other scented flowers, can be less perfectly or less purely recovered by distillation than by maceration, a process based on the property of fats for greedily absorbing perfumes, which they subsequently cede to very strong alcohol.

The maceration process is a very simple operation.

The fat is placed in a porcelain or enamel-lined iron pan, which is then warmed to about 40° (highest 50°) C., by setting it in a shallow vessel containing hot water, the flowers to be extracted being enclosed in bags of fine linen and placed in the fat, where they are allowed to remain for one-half to two days. The bags are then taken out, drained, pressed, refilled with fresh flowers, and returned to the pan. This operation is repeated twelve to sixteen times, or even more, and furnishes a highly scented pomade or oil.

The perfumes are extracted from the pomades or "huiles antiques" by treating the latter with 90-95 per cent. alcohol, which dissolves out the perfumes but leaves the fat untouched. In the case of oils, the extraction is effected by shaking them up with the alcohol in large glass bottles; but the pomades have to be cooled down until solidified, and then cut up into very small pieces for agitation with the spirit. A better plan is to put the pomade in a cylinder with a fine aperture at the bottom, through which, by the aid of a close-fitting piston, the fat is expressed in the form of a fine thread, thus exposing a very large surface and facilitating extraction by the alcohol. The solution obtained as the result of an exposure of several weeks' duration in the above manner is then distilled at a low temperature.

When glycerine is used instead of fat, the method of treatment is the same, except that benzol is employed as the extracting solvent in place of alcohol, owing to the circumstance that the latter dissolves glycerine as well as ethereal oils.

### THE ABSORPTION OR ENFLEURAGE METHOD

In this method also the absorbent property of the fats and oils for perfumes is utilised, but the treatment of the flowers is carried on at the ordinary temperature. In this case the fat—lard—is spread out about ¼ inch thick, on glass plates, some 40 inches long and 24 inches wide, which are then laid on wooden frames and covered over with the flowers. The frames are placed one above another and left for one to three days, after which the withered flowers are replaced by fresh ones, and this operation is repeated until the pomade has attained the desired strength.

A useful modification of this method consists in introducing into a tightly closed case a large number of glass plates, covered with lard that has been converted into thin threads by means of a jet. This case is placed in communication with a second one, filled with flowers and provided with an aperture at top and bottom. One of these apertures communicates with the first case by means of a pipe, and a current of air is drawn through the whole apparatus by suitable means, such as a fan driven by clockwork. The air drawn out of the case containing the flowers is laden with perfume, which it surrenders to the fat in passing through the other case.

By the use of this apparatus several important advantages are secured. In the first place, the absorption proceeds at a rapid rate, only a small amount of motive power is required, and the flowers never come in direct contact with the fat, which therefore cannot absorb anything beyond the perfume floating in the air.

The place of fat can be filled by carbon dioxide, in which event the following apparatus is used. A number of lumps of white marble are placed in a large glass vessel, and to them is introduced, at intervals and by means of a funnel, a quantity of hydrochloric acid. The resulting stream of carbon dioxide gas is passed through a washing flask charged with water, and is then led through a chamber of sheet metal filled with the flowers to be extracted, whence it is delivered into a flask filled with strong alcohol and surrounded with cold water. The gas takes up the perfume from the flowers in the state of vapour, and gives up the same to the alcohol, being itself discharged through an effluent tube in the alcohol vessel

### THE EXTRACTION METHOD

The most suitable solvents for this purpose are petroleum ether and carbon disulphide, these being cheaper than chloroform or ether.

The apparatus employed consists of a tinplate cylinder, which carries at its upper end an annular channel provided with a tap, and can be closed by means of a cover, also provided with a tap. At the bottom of the cylinder is a tube, which can be closed by means of this tap. The cylinder is charged with the flowers to be extracted, and with the solvent,—petroleum ether or carbon disulphide,—the lid is put on, and water is poured into the annular channel, thus forming a hermetical seal. After the extraction is completed, which takes about thirty to forty minutes, both taps are turned on, and the liquid is run into the retort attached to the apparatus. If it be desired to repeat the extraction, the water seal is removed and a fresh quantity of solvent is poured over the flowers through the lid of the vessel.

Having thus seen how the perfumes can be extracted and recovered from the materials in which they are contained, we will now proceed to consider the substances which possess any importance in connection with the preparation of cosmetics.

It is advisable to distinguish between—

1. Chemical products.
2. Animal substances.
3. Oils and fats.

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# CHAPTER III

## Chemical and Animal Products used in the Manufacture of Cosmetics

### Chemical Products

ETHER, which is also known as "sulphuric ether," is prepared by distilling alcohol with sulphuric acid and rectifying the product by a second distillation. In the pure state, ether is a thin-flowing, strong-smelling, and inflammable liquid. The sp. gr. is 0·736, and the boiling point 35° C. Ether possesses high solvent powers for ethereal oils, resins, and fats. Being highly volatile, ether rapidly disseminates its vapour through the air; and as this vapour is exceedingly inflammable, it is necessary to keep all lights away from the vicinity of bottles containing the liquid in question.

It is well known that in mixing water and sulphuric acid, the latter should always be poured into the water, and not *vice versa*. According to Orlow, the reverse procedure must be followed in mixing ether and sulphuric acid, since he observed that when this acid is poured into ether, violent spurting, sometimes even accompanied by explosion, occurs; whereas, when the operation is performed in the converse manner, it is free from danger. The ether used must be water-white, exhibit the true odour and flavour of ether, and must not impart a red coloration to litmus paper. An addition of alcohol increases the sp. gr. Pure ether leaves no residue on evaporation, and should not turn milky when mixed with water, but float on the surface of the latter.

So-called pure commercial ether invariably contains certain impurities, chiefly organic sulphur compounds which are left behind as a malodorous residue on the spontaneous evaporation of the ether. The name of sulphuric ether is all the more applicable, owing to the presence of free sulphur in solution. This may be readily detected by agitating the suspected sample with a little pure bright metallic mercury in a test tube. If the amount of sulphur be only very small, the surface of the mercury merely turns a dull grey; but when a relatively large amount of sulphur is present, the entire liquid becomes grey or black from mercury sulphide.

### ALCOHOL

Pure alcohol is a thin liquid, of sp. gr. 0·8095, boiling at 78°·4 C., but requiring a temperature far below −100° C. to effect its solidification. By evaporating solid carbon dioxide with ether, Dewar obtained a temperature which is estimated as about −200° C., and which caused alcohol to freeze as a crystalline solid mass, exhibiting the peculiarity of not suddenly becoming liquid when thawed, but of first passing through an intermediate viscous stage resembling glycerine. Alcohol is characterised by a high solvent power for resins, balsams, and ethereal oils. For the production of absolute alcohol, Yoon employed calcium carbide. When this last-named substance is broken into lumps and treated with 90-95 per cent. alcohol, it is briskly attacked and continues to liberate acetylene so long as any water remains in the alcohol; as soon, however, as all the water has been absorbed by the carbide, the evolution of gas ceases. Hence calcium carbide affords a means of testing alcohol for the presence of water. The resulting alcohol no longer gives a precipitate with barium alcoholate; consequently calcium carbide is just as delicate a reagent as the latter, and enables absolute alcohol to be obtained from 95 per cent. (or even 90 per cent.) spirit in at most two distillations. For this purpose the alcohol to be rectified is mixed with 25 per cent. by weight of calcium carbide, repeatedly agitated, left to settle until the liberation of gas ceases, and is then distilled. The distillate is freed from any accompanying acetylene by adding a small quantity of calcined copper sulphate and distilling anew.

For the preparation of absolute alcohol in glass vessels and on the small scale, Habermann has recommended that the lime used for this purpose should be added not to the still direct, but allowed to act in a vessel communicating therewith. This vessel consists of a cylinder, drawn out to a fine tube at the lower end, and inserted in the path of the distilled vapour on its way to the condenser. This cylinder contains a narrow cylindrical roll of iron-wire gauze, closed at the upper end, and resting with its lower end against the tapered portion of the glass cylinder, whilst the top extends to within a few centimetres of the stopper of the latter. The annular space between the gauze and the glass is filled with a weighed quantity of quicklime, in lumps as large as hazel nuts. The still being charged with a corresponding quantity of (at least 95 (vol.) per cent.) alcohol, the attachment containing the lime is tightly fixed on and connected with the condenser. The still is then heated on the water bath, slowly at first, so that only a small quantity of the alcohol distils over during the first two hours, at the end of which time the receiver is changed. This vessel is connected with the condenser by a cork provided with a double bore fitted with a calcium chloride tube open at both ends. Should the quicklime be found to have become wet and pappy during distillation, the operation must be suspended and the lime replaced by a freshly charged tube, since in the condition mentioned the lime has not only lost its power of absorbing moisture from the alcohol, but is capable of ceding such to the alcohol.

In order to deodorise alcohol for cosmetic purposes, 5 parts of alcohol should be left for several days in contact with a mixture of powdered charcoal 30 parts, quicklime 60, and powdered alum 8 parts, the whole being frequently agitated, and finally filtered.

Potassium permanganate also is recommended as an excellent means for rectifying alcohol, 2-3 c.c. of an aqueous solution of permanganate—15·89 grams of this salt to 100 c.c. of water—being sufficient for 1 litre of badly flavoured spirit. The alcohol can be separated from the resulting black precipitate by decantation.

Another excellent means for rectifying once-distilled alcohol is found in sodium peroxide. The quantity employed per hectolitre varies from 100 to 150 grams of sodium peroxide, added twenty-four hours previous to rectification. By this means the regular progress of the reaction is ensured, the separation of the impurities is accentuated, and a higher yield of alcohol of pure flavour is obtained.

The usual tables for preparing 90 per cent. wine spirit from stronger alcohol are arranged in percentages; but it is better to employ a table based on sp. gr. as follows:—

| Sp. gr. at 15° C. | 1000 Grams of 90% Spirit contain | | Sp. gr. at 15° C. | 1000 Grams of 90% Spirit contain | |
|---|---|---|---|---|---|
| | Alcohol Grams. | Water Grams. | | Alcohol Grams. | Water Grams. |
| 0·8070 | 894·6 | 105·4 | 0·8130 | 914·5 | 85·5 |
| 0·8075 | 896·2 | 103·8 | 0·8135 | 916·3 | 83·7 |
| 0·8080 | 897·8 | 102·2 | 0·8140 | 918·1 | 81·9 |
| 0·80833 | 898·88 | 101·12 | 0·8145 | 919·9 | 80·1 |
| 0·8085 | 899·4 | 100·6 | 0·8150 | 921·7 | 78·3 |
| 0·8090 | 901·05 | 98·95 | 0·8155 | 923·5 | 76·5 |
| 0·8095 | 902·65 | 97·35 | 0·8160 | 925·3 | 74·7 |
| 0·8100 | 904·3 | 95·7 | 0·8165 | 927·13 | 72·87 |
| 0·8105 | 905·95 | 94·05 | 0·8170 | 928·95 | 71·05 |
| 0·8110 | 907·6 | 92·4 | 0·8175 | 930·8 | 69·2 |
| 0·8115 | 909·3 | 90·7 | 0·8180 | 932·6 | 67·4 |
| 0·8120 | 911·0 | 89·0 | 0·8185 | 934·4 | 65·6 |
| 0·8125 | 912·75 | 87·25 | | | |

### CHLOROFORM

Chloroform is obtained by distilling wood spirit, common salt, and sulphuric acid, and rectifying the distillate. One method of preparing pure chloroform is based on the precipitation of chloroform salicylide from impure chloroform. The salicylide is obtained by the action of phosphorus oxychloride on salicylic acid, and this class of substances give, with chloroform, products that are only sparingly soluble, if at all, and crystallise in an excellent manner. The combination is very unstable, the chloroform being liberated on the application of gentle heat; and it can be prepared in this manner, in a perfectly pure state, just before use. Chloroform has an agreeable odour, a sweet taste, boils at 61° C., and is of sp. gr. 1·48. On account of its high solvent powers and low boiling point, it is largely used for the extraction of vegetable perfumes.

Numerous experiments have been made on the decomposition and preservation of chloroform. Allen showed that an addition of sulphur, in the proportion of 1 : 1000, retards the decomposition of chloroform in daylight. In this decomposition, oxygen plays a considerable part, and chlorine is always present in the first stage of the reaction; it would therefore seem as though the sulphur acts as a reducing agent, and that any readily oxidisable substance soluble in chloroform would have the same effect. With this object Dott divided a sample of chloroform into four portions, a very small amount of morphia being added to the first, gallotannic acid to the second, hypophosphorous acid to the third, and nothing at all to the fourth. After a few weeks, the pure chloroform exhibited signs of decomposition, as evidenced by the smell and on the addition of silver nitrate. The others remained entirely unaltered, even after exposure to light for a month longer.

### BENZOIC ACID

The preparation of benzoic acid from benzoin can be performed by any one in a very simple manner, by digesting this resin with 3-4 parts of strong acetic acid. The resulting brown solution is decanted and poured into 4 parts of boiling water. The resin is deposited as a greyish brown mass, and the liquid, after filtration and cooling, furnishes crystals of benzoic acid (most of that present in the solution), a further quantity being obtainable by concentrating the residual liquid after partial saturation with quicklime. In working on a large scale, the acetic acid would, of course, be recovered from the liquor.

The resin thrown down from the acetic solution has an agreeable and aromatic odour when dried and melted, and can be used up for other purposes. On account of the preservative qualities of benzoin, it is advisable to add this by-product to the pitch used for lining beer and other casks.

## BENZOL AND BENZINE

According to the raw materials from which it is prepared, namely, coal tar or petroleum, the product is known as benzol or benzine, the former having the sp. gr. 0·850, and boiling at 82° C., whilst the latter the sp. gr. 0·730, and a variable boiling point which does not fail below 130° C. Benzol from coal tar is exclusively used by the makers of coal-tar dyes; but for cosmetic purposes the petroleum benzine is the only one coming under consideration, as it is used for the extraction of perfumes from flowers.

A simple distinguishing test for benzol and benzine is afforded by iodine, a small crystal of which will impart a carmine red coloration to the former, and a violet tinge to the latter. This reaction is very reliable, and also applicable to mixtures of benzol and benzine. Another simple and reliable test is by agitation with a little alcohol, which produces considerable turbidity in the case of benzol, but leaves benzine perfectly clear. To perform this test, a few drops of 95 per cent. alcohol are poured into a dry test tube and then thrown out again, so as to leave only a very minute quantity behind; 1-2 c.c. of the suspected benzine is then run in, and the whole well shaken up. A turbid, milky liquid indicates the presence of benzol; but if the liquid remain quite clear, the heavier drops quickly separating from the rest, only benzine is present. The alcohol test is simpler than that with iodine, and gives equally reliable indications, provided the method is performed as above.

To rectify benzine, Gawalowski recommends the following treatment:—

When a malodorous benzine is treated with an addition of about 1-2 per cent. of free fatty acids, the latter are dissolved. About ½ per cent. of tannin is then added, and the whole well mixed together. Finally, an addition is made of sufficient potash or soda lye, or milk of lime, to saponify the fatty acids and neutralise the tannin. After shaking the mixture and leaving it to stand a while, the milky liquid separates into two layers, the mucilaginous soapy matters sinking to the bottom, and leaving the clear, colourless, and deodorised benzine floating above. This, when decanted and filtered, gives a product capable of immediate utilisation for many technical purposes, and convertible, by redistillation, into a perfectly pure benzine.

Beef fat, olive oil, or other fats and oils, may be used for the above treatment, provided the same be free from rancidity. The olein—oleic acid—used by candlemakers can also be employed, but should first be shaken up with a 0·1 per cent. solution of soda, in order to eliminate the malodorous liquid fatty acids, butyric acid in particular.

Another method of deodorising benzine is as follows:—

4½ litres of benzine are well mixed with ½ litre of sulphuric acid, 1¾ litres of water, and 30 grams of potassium permanganate, then left for twenty-four hours, and the decanted benzine afterwards shaken up with a solution of

7½ grams of potassium permanganate and 15 grams of soda in 1 litre of water.

### AMMONIUM CARBONATE

Commercial ammonium carbonate is a mixture of ammonium mono- and bicarbonate, and may be prepared by heating an intimate mixture of 1 part of ammonium sulphate and 2 parts of chalk in horizontal cylindrical, cast-iron retorts, 7-10 feet long and 20 inches in diameter, the vapour being collected in stone chambers, where the salt settles down on the walls and is afterwards chipped off. Behind these chambers is a coke scrubber containing sulphuric acid for the vapours not condensed in the chambers, together with free ammonia and ammonium sulphate. Seventy-six parts of chalk are consumed for each 100 parts of ammonium sulphate, and 59-60 parts of ammonium carbonate are obtained. The crude salt is usually sublimed over again. The sublimation and purification are performed at a lower temperature, not exceeding 65-70° C., the waste heat from the retorts being employed to heat a water bath for this purpose. The iron pans used are surmounted by unsoldered leaden cylinders formed by rolling sheet lead, and open at both ends, the upper ends being covered with leaden plates and a luting of paper. When the operation is complete, the cylinders are cooled down, the paper luting removed, and the sheets unrolled to enable the product to be taken out. When pure, ammonium carbonate will volatilise, without leaving any residue, if heated on a bright piece of platinum foil.

Ammonium carbonate is readily soluble in cold water,—25 : 100,—but is decomposed by hot water; it is only sparingly soluble in alcohol.

### OIL OF BITTER ALMONDS

Oil of bitter almonds consists of benzoyl hydride or benzaldehyde. It may be prepared by artificial means, but this method is not adopted in practice, the oil being obtainable more cheaply from bitter almonds.

Pure oil of bitter almonds is colourless; of high refractive power, and with a very intense odour of bitter almonds. By the action of the air it is gradually changed into an inodorous and colourless crystalline mass, consisting of benzoic acid. This change is facilitated by light, and therefore the oil should always be stored in hermetically closed bottles, protected by an opaque envelope.

The oil is adulterated with nitrobenzol, alcohol, and light ethereal oils. Nitrobenzol may be detected by placing 10 drops of the oil in a narrow test cylinder along with 5 c.c. of 90 per cent. alcohol and 5 c.c. of water (or 10 c.c. of 45 per cent. alcohol), closing the cylinder with the finger, and gently turning the mixture round twice. Under this treatment, pure oil of bitter almonds is immediately dissolved to a clear solution; but if even only 1 per cent. of nitrobenzol be present, the liquid is clouded and the drops of nitrobenzol can be seen floating about previous to collecting at the bottom of the vessel. The formation of merely a turbid solution indicates adulteration with other ethereal oils. The test recommended by Maisch consists in dissolving 1 gram of oil in 8 grams of alcohol, adding 1 gram of caustic potash, and warming the whole until one-third of the alcohol has evaporated. Pure oil gives a brown liquid, but in presence of nitrobenzol a brown resin is deposited. According to Hofmann, a bluish violet coloration is obtained, in presence of nitrobenzol, on diluting the oil with ether, adding a little hydrochloric acid and sulphuric acid, and afterwards a little alcohol and a few granules of zinc, the mixture being shortly after neutralised with potash, shaken up, the ether allowed to elaborate spontaneously, and the liquid treated with a few drops of bleaching powder solution. A test, introduced by Wagner, is based on the different sp. gr. of mixtures of bitter almond oil and nitrobenzol, and on the readiness with which the former combines with alkali bisulphites. Commercial oil of bitter almonds varies in sp. gr. between 1·040 and 1·044; nitrobenzol, between 1·180 and 1·201.

The weight per given volume of mixtures of oil of bitter almonds and nitrobenzol is as follows:—

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 c.c. of pure oil of bitter almonds weigh | | | | ... | 5·29 | grams. |
| 5 | do. | do. | containing 25 per cent. of nitrobenzol, | weigh | 5·39 | do. |
| 5 | do. | do. | do. 50 do. | do. | 5·57 | do. |
| 5 | do. | do. | do. 75 do. | do. | 5·75 | do. |
| 5 do. of pure nitrobenzol | | | | do. | 5·90 | do. |

If 5 c.c. of commercial oil of bitter almonds be shaken up in a graduated test glass with 35 c.c. of a concentrated solution of calcium- or sodium bisulphite, and the mixture is then made up to 50 c.c. with water, any nitrobenzol present will float on the top, and the amount can be approximately estimated. This treatment will also cause the separation of any extraneous ethereal oils. To facilitate the collection of the nitrobenzol, it is advisable to add 5 c.c. of benzine to the oil on commencing this test, the added volume being deducted from the total in the supernatant layer of nitrobenzol.

Oil of bitter almonds is also adulterated with alcohol, and in such event exhibits a lower sp. gr. than usual. Should the alcohol amount to 8-10 per cent., the addition of a twofold volume of nitric acid (sp. gr. 1·42) causes the liquid to swell up in a few minutes and disengage nitrous fumes.

The presence of artificial oil of bitter almonds in the natural oil can be detected in the following manner:—A strip of filter paper, impregnated with a few drops of the suspected oil, is ignited, and the products of combustion are caught in a damp beaker. Water is then added to the beaker, and the liquid is filtered and treated with silver nitrate solution. Should the artificial oil in question be present, a white precipitate will be obtained, owing to the chlorine invariably accompanying the said oil.

### BORAX

In preparing borax from boric acid, a quantity of soda crystals (*e.g.*, 1300 kilos) is dissolved in water, and the solution raised to 100° C. by the aid of steam, whereupon a corresponding quantity (1200 kilos) of purified commercial boric acid is added in small portions (4-5 kilos).

Borax is soluble to the extent of 6 parts in 100 of cold water, or 2 to 1 in hot water; it is insoluble in alcohol.

In purchasing borax, attention should be bestowed on the colour: pure borax is quite white, whereas a reddish coloration indicates contamination with ferric oxide.

### CUMARIN

Cumarin occurs in the Tonka bean, the blossoms of melilot trefoil, the leaves of giant clover, the fruit of *Myroxolon toluiferum*, in woodruff, rue, and sweet vernal grass. It is artificially prepared by treating sodium salicylal with acetic anhydride. Pure cumarin forms handsome white acicular crystal, which possess a very agreeable odour; they melt at 67° C. The rates of solubility are as follows:—

Cumarin dissolves in 400 parts of cold water (at 15° C.), or 45 parts of boiling water; is readily soluble in alcohol and ether, as well as acetic acid and ethereal oils.

### ACETIC ACID (GLACIAL ACETIC ACID)

In its purest form acetic acid is a colourless liquid, with a strongly acid taste and smell; it solidifies to colourless crystals at 8° C. Like alcohol, this acid dissolves ethereal oils, and is employed in the preparation of numerous toilet vinegars and washes.

In chemical works, glacial acetic acid is prepared in a cheap and pure form by distilling sodium acetate with sulphuric acid.

The reagent for detecting mineral acids in acetic acid is rosaniline hydrochloride. One c.c. of the acetic acid to be examined is poured into a shallow porcelain dish, and treated with one drop of an alcoholic solution of rosaniline hydrochloride—25 grams of fuchsine in 100 c.c. of 90 per cent. alcohol. If the sample be pure, no alteration in the red-violet colour of the fuchsine occurs on mixing the two liquids; in fact, the colour is rather intensified. In presence of mineral acids, however, even as low as 1 per cent., the colour changes to a dirty yellow. The characteristic colour of the fuchsine is restored by neutralisation with pure alkali.

For detecting the presence of sulphuric acid or hydrochloric acid, Hager proposes warming 1 large or 2 small drops of gurjun balsam—East Indian Copaiba balsam—with 35-40 drops of pure acetic acid, in a not too wide test tube, and warming the same with agitation. On then adding at most 3 drops of the suspected sample, a blue violet coloration ensues, at once if hydrochloric acid be present, or more slowly in presence of sulphuric acid. The development of this coloration may be accelerated by warming the mixture above 60° C. This reaction requires only two to three minutes for its performance.

### NITROBENZOL

Nitrobenzol is formed by treating benzol, or a mixture of this and toluol or higher homologues, with strong nitric acid or a mixture of nitric and sulphuric acids, washing the product with water and sodium carbonate, caustic soda, or ammonia, driving off the unaltered hydrocarbons with steam, and rectifying the residue.

The substances technically comprised under the name nitrobenzol generally form yellowish or brownish liquids, with a high refractometer index; they are of oleaginous consistence, and possess an intensely sweet, empyreumatic taste, are sparingly soluble in water (to which, however, they impart their odour), are miscible to a clear liquid with alcohol, ether, chloroform, carbon disulphide, benzol, benzine, petroleum ether, and most of the fats and the ethereal oils. They can be distilled without alteration, but undergo decomposition, occasionally accompanied by explosion, when rapidly and strongly heated. According as the nitrobenzol is prepared from light or heavy benzol, the product is known as light or heavy, these terms applying to the boiling point and not to the density.

Light nitrobenzol, also known as nitrobenzol for blue and black (in the dyestuff trade), is an almost pure article, pale yellow in colour, and (in comparison with the others) of agreeable smell, recalling bitter almonds. The sp. gr. is 1·186-1·2; boiling point, 205-210° C.; solidifying (crystallising) point, 3° C. It serves as a perfume,—artificial oil of bitter almonds, mirbane oil, mirbane essence,—especially for fats and soaps. Only this light nitrobenzol, however, is suitable for this purpose. An extra fine quality, nearly or quite colourless, and water-white, is prepared, for this use, from pure crystallisable benzol, and purified by washing with potassium bichromate and sulphuric acid, followed by rectification with steam.

The detection of nitrobenzol as an adulteration in oil of bitter almonds has already been dealt with under the latter heading.

The following reaction is suitable for the detection of nitrobenzol in soaps, etc. Two drops of carbolic acid, three of distilled water, and a piece of caustic potash the size of a pea, are placed in a porcelain basin and warmed carefully until boiling point is reached. On then at once adding a few drops of a mixture of water and nitrobenzol and continuing to boil the liquid, it will be found that a carmine red coloration is produced around the edges, which colour is changed to emerald green by the addition of a saturated solution of bleaching powder. To detect nitrobenzol in liquids, and isolate it from same, the liquid in question is concentrated to a small volume, treated with quicklime, cooled, and finally extracted with ether. The solvent is evaporated to dryness, taken up by shaking with a small quantity of distilled water, and treated as above. Soaps are dissolved in water, treated with an excess of quicklime, extracted with ether, and treated in the same manner.

With a few modifications, the following process can be utilised for our purposes. For detecting nitrobenzol in confectionery, fruits, etc., Dammer proposed the following method:—

Nitrobenzol can be readily detected by shaking up a sufficient quantity of the fruit with ether, evaporating the latter, treating the residue with a little powdered iron and an aqueous solution of sulphuric acid, concentrating, decomposing the residue with a little caustic soda solution, extracting the resulting aniline with alcohol, driving off the solvent after acidifying with sulphuric acid, and finally adding a little potassium chromate and sulphuric acid. A blue coloration indicates nitrobenzol.

Now, in many cases this process is too complicated, and, as for small quantities, unreliable; and as it is generally merely a question whether the smell of bitter almonds in a soap is due to the presence of natural or artificial oil of bitter almonds, the ready oxidisability of the true oil forms a convenient test. When crushed bitter almonds are stirred with water until they exhibit a powerful odour, the smell of hydrocyanic acid can be destroyed by warming them with a little dissolved soda and a few drops of a ferrous salt. On then adding sufficient potassium permanganate, the odour of oil of bitter almonds is also destroyed. This treatment gives no results in the case of nitrobenzol, and therefore affords a means of detecting the presence of this latter.

### ACETIC ETHER

Small quantities of acetic ether are found in vinegar, French brandy, and certain wines. It is formed by the action of acetic acid on alkalis; by treating an alcoholic solution of potassium acetate with carbon dioxide, and is obtained by distilling on the water bath a cooled mixture of 1305 parts of concentrated sulphuric acid, 655 parts of 90 per cent. alcohol, and 1000 parts of anhydrous sodium acetate. The distillate is shaken up with lukewarm water, then separated therefrom, shaken up with anhydrous sodium carbonate, dehydrated with calcium chloride, and rectified.

It is a colourless liquid, with an agreeable, refreshing taste and smell. The sp. gr. is 0·924, the boiling point 72·8° C. It dissolves in 17 parts of water at 17·5° C.; is miscible with alcohol and ether, has a neutral reaction, is decomposed into alcohol and acetic acid when in the state of an aqueous solution, and when its vapours are mixed with air and heated. It burns with a smoky flame, and is decomposed by caustic alkalis, the same result being effected by alkali carbonates in the warm.

### BUTYRIC ETHER

Butyric ether (pineapple essence) is obtained by saponifying butter with caustic potash, distilling the soap with alcohol and sulphuric acid, and rectifying the distillate. It is a combustible liquid, boiling at 119° C., and exhibiting a strong odour of pineapple.

### VALERIANIC ETHER

Valerianic ether is prepared by distilling sodium valerianate with alcohol and sulphuric acid; it boils at 133° C., and disengages an odour of apples.

### ESSENCE OF JARGONELLE PEAR

This substance, chemically known as amyl valerianate, is prepared from the amyl alcohol so largely formed as a by-product of the manufacture of potato spirit. This amyl alcohol is carefully heated in a still with potassium bichromate and sulphuric acid. The distillate possesses an agreeable odour of pears, and boils at 196° C.

### NITROUS ETHER

Nitrous ether is obtained by the action of nitric or nitrous acid on alcohol. With this object, 8 parts of fuming nitric acid, 4 of water, and 9 of alcohol (90 per cent.), are poured, in superimposed layers, into a flask. This is left to stand for several days, after which time the ether is drawn off. Another method is to pass well-cooled nitrous acid, formed by the action of nitric acid (1·3) on starch, into a cold mixture of 2 parts (85 per cent.) alcohol and 1 of water, the liberated ether being collected in a condenser.

It is a colourless liquid, with an agreeable fruity smell and peculiarly stinging taste; the density is 0·900 at 15·5° C.; the boiling point 17° C. It produces great cold on evaporation, is readily inflammable, sparingly soluble in water, miscible with alcohol and ether, decomposes on storage, liberates nitrogen, turns acid, is gradually decomposed by caustic potash, and furnishes alcohol, water, ammonia, and sulphur when treated with sulphuretted hydrogen.

### GLYCERIN

Glycerin is produced on a large scale as a by-product of candle making, and is put on the market in a very poor state. In this industry fat is converted into stearin by heating it with either lime or sulphuric acid, or with high-pressure steam, whereby the glycerin is obtained as an aqueous solution, of a strength not exceeding 4-5° Be. In the first-named method of saponification, however, it is contaminated with lime, and in the second with sulphur. After these impurities have been eliminated as completely as possible, the glycerin solution is concentrated to about 24-30° Be., in which condition it is a more or less bluish syrupy liquor, and forms commercial crude glycerin. There are two methods of refining this article; distillation with superheated steam, and decloration by means of bone black, the product from the first method being known as distilled glycerin, and that from the second as refined glycerin: the former, however, is the sole means of furnishing a chemically pure product. When chemically pure, glycerin should not give any turbidity either with ammonia and ammonium oxalate, or with nitric acid and silver nitrate, nor should it give any coloration when treated with the last-named reagent alone, or evolve any odour when rubbed in the hand.

Glycerin is miscible with water in all proportions, and therefore is met with in various degrees of dilution in commerce. The percentage of glycerin in aqueous solutions of different densities (at 12-14° C.) is set forth in the subjoined table, compiled by Lang:—

| Glycerin % | Sp gr. | Glycerin % | Sp. gr. | Glycerin % | Sp. gr. |
|---|---|---|---|---|---|
| 100 | 1·2641 | 82 | 1·2212 | 64 | 1·1702 |
| 99 | 1·2664 | 81 | 1·2185 | 63 | 1·1671 |
| 98 | 1·2637 | 80 | 1·2159 | 62 | 1·1640 |
| 97 | 1·2610 | 79 | 1·2122 | 61 | 1·1610 |
| 96 | 1·2584 | 78 | 1·2106 | 60 | 1·1582 |
| 95 | 1·2557 | 77 | 1·2079 | 55 | 1·1455 |
| 94 | 1·2531 | 76 | 1·2042 | 50 | 1·1320 |
| 93 | 1·2504 | 75 | 1.2016 | 45 | 1·1183 |
| 92 | 1·2478 | 74 | 1·1999 | 40 | 1·1045 |
| 91 | 1·2451 | 73 | 1·1973 | 35 | 1·0907 |
| 90 | 1·2426 | 72 | 1·1945 | 30 | 1·0771 |
| 89 | 1·2398 | 71 | 1·1918 | 25 | 1·0635 |
| 88 | 1·2372 | 70 | 1·1889 | 20 | 1·0498 |
| 87 | 1·2343 | 69 | 1·1858 | 15 | 1·0374 |
| 86 | 1·2318 | 68 | 1·1826 | 10 | 1·0245 |
| 85 | 1·2292 | 67 | 1·1795 | 5 | 1·0123 |
| 84 | 1·2265 | 66 | 1·1764 | 1 | 1·0025 |
| 83 | 1·2238 | 65 | 1·1733 | | |

Glycerin readily absorbs perfumes, and is employed, in conjunction with these, for the preparation of toilet articles.

### HELIOTROPIN

Heliotropin is obtained by the oxidation of piperic acid with potassium permanganate. It forms very long, lustrous crystals, melting at 37° C., and boiling at 263° C. The odour is similar to cumarin. Heliotropin is only sparingly soluble in cold water, though more easily so in hot; readily soluble in alcohol and ether; and furnishes piperonylic acid when boiled with alcoholic caustic potash. Artificial heliotropin is prepared from white pepper by extracting with alcohol,—0·833,—treating the extract with caustic potash, and purifying the residue by recrystallisation from alcohol. The piperin obtained in this manner is converted into potassium piperate by heating on the water bath for twenty-four hours, under a reflux condenser, in a flask containing an equal weight of caustic potash and 5 to 6 parts of alcohol. The lustrous yellowish plates of potassium piperate deposited on cooling are washed with cold alcohol, recrystallised from hot water, and, when necessary, decolorised with bone black. To prepare piperonal from this product, 1 part is dissolved in 40-50 parts of hot water, and to the hot solution is added a solution of 2 parts of potassium permanganate, run in slowly with constant stirring. A pulpy mass is formed, which is strained, and is washed repeatedly with hot water until it ceases to disengage the characteristic odour of heliotropin. The united liquids are distilled over a naked flame; the distillates are collected in fractions, because the first runnings are the most productive; and from these the greater part of the piperonal crystallises out on cooling, the remainder being recovered by agitation with ether.

The ready solubility of heliotropin in all ethereal oils and alcohol greatly facilitates its use. The amount taken, however, must be rather large, since, in the case of soap, a good result will not be obtained unless the quantity of heliotropin attains 500 grams per 100 kilos (about ½ lb. per cwt.); whilst for fine, highly scented toilet soaps double that amount is requisite. The perfume is largely increased and improved by an addition of about 100 grams of cumarin; and very agreeable results can be obtained by adding petit grain oil, bergamot-oil, or lemon oil, which freshen up the perfume of the heliotrope.

### PYROGALLIC ACID

Pyrogallic acid is obtained by heating well-dried gallic acid with twice its weight of powdered pumice to 215° C. on an oil bath, whereby the first-named substance is decomposed into carbon dioxide and pyrogallic acid. It forms brilliant white, elongated plates, and, when dissolved in water, especially in presence of alkalis, rapidly absorbs oxygen and turns brown. Gold and silver are reduced from their solutions by this acid; and with salts of iron it furnishes blue-black compounds.

### LIVER OF SULPHUR

Liver of sulphur, or potassium trisulphide, is prepared by fusing together, potash and sulphur, and forms a liver-coloured mass, which slowly decomposes on exposure to the air, sulphuretted hydrogen being disengaged; consequently the preparation must be stored in tightly closed vessels. When dissolved in water and brought into contact with salts of lead or silver, liver of sulphur produces a black precipitate of lead—or silver sulphide.

### CALCIUM SULPHIDE

On calcining calcium sulphate—gypsum—with carbon, calcium sulphide is formed as a yellowish white mass, which is transformed into calcium hydrosulphide when treated with water. The hydrosulphide can also be obtained by passing sulphuretted hydrogen gas through milk of lime, and takes the form of a grey mass, smelling strongly of sulphuretted hydrogen. The proportions employed in the preparation of calcium sulphide are: anhydrous gypsum, 7 parts; wood charcoal, 3 parts; and the calcination is conducted out of access of air. Calcium penta-sulphide may be prepared by heating an intimate mixture of slaked lime to incandescence with ½-1 part of powdered sulphur, and continuing the heating for half an hour longer.

## STARCH

Starch is prepared from various vegetable substances, such as potatoes, rice, arrowroot, sago, etc., and, in the pure state, takes the form of an insoluble white powder, which, under the microscope, is seen to consist of granules built up of a number of superimposed layers. Considerable differences in price exist between the various commercial forms of starch. Purified potato starch can be used for face and toilet powders.

Wroblewski has proposed the following method for the production of soluble starch:—

One hundred grams of rice starch are carefully triturated with a 2 per cent. solution of caustic potash until a perfectly fluid mixture is obtained, and left to stand for three to four hours, after which a further quantity of potash solution is stirred in, so as to make up the volume to 600-800 c.c. This is heated on the water bath until complete liquefaction ensues, and, after continuing to heat for another twenty to thirty minutes over a naked flame, the liquid is filtered, supersaturated with acetic acid, and finally precipitated with an equal volume of 95 per cent. alcohol. The precipitate is redissolved, reprecipitated, and then taken up with a minimum quantity of water. The solution is poured in a thin stream into a large volume of absolute alcohol, the precipitate being filtered, washed with alcohol and ether, and finally dried *in vacuo*.[*] The yield amounts to 50-60 per cent.

This soluble starch is a snow-white powder, perfectly non-hygroscopic, insoluble in alcohol of 40 per cent. strength and over, and incapable of dialysation. One hundred parts of water will dissolve 3-4 parts to form a slightly opalescent liquid, which is precipitated by the sulphates of ammonia, magnesia, and soda, but not by sodium chloride. Tannin also produces a precipitate, which, however, is soluble in water after having been washed with alcohol. On the other hand, dilute solutions of soluble starch are not precipitated by phosphotungstic acid, phosphomolybdic acid, potassium-mercury iodide, mercuric chloride, or mercurous nitrate; and lead acetate produces merely a faint turbidity.

### VANILLIN

Vanillin occurs in vanilla pods, and is also obtained from calcium vanillate by dry distillation, from coniferin and coniferyl alcohol. It forms colourless prisms, tastes and smells strongly of vanilla, is readily soluble in hot water, alcohol, and ether. It melts at 80-84° C., sublimes, boils at 285° C. in a current of carbon dioxide, has an acid reaction, and forms crystalline salts.

### MENTHOL

Menthol is the stearoptene of oil of peppermint. It is found in this oil, especially the American and Japanese kinds,—Japanese oil containing 50-55 per cent., American oil 20-25 per cent., English oil 40-45 per cent.,—from which it crystallises out in the cold, more particularly from the less volatile portions. Menthol forms colourless prisms, smells strongly of peppermint, has a burning taste, is sparingly soluble in water, but readily so in alcohol and ether; melts at 42° C., boils at 213° C., is volatile and neutral. It dissolves certain salts,—magnesium sulphate, for example,—and deflects polarised light towards the left.

The following method is given by Kleber for the rapid approximate determination of menthol in oil of peppermint:—

About 5 grams of peppermint oil are carefully weighed out, along with a measured volume (about 5 c.c.) of anhydrous acetic acid, and boiled for half an hour under a reflux condenser. In the meantime, an equal quantity of anhydrous acetic acid is titrated with normal caustic soda and phenolphthalein. After the boiled liquid has been somewhat cooled down, the condenser is rinsed out with water, the rinsings being added to the acetylised mixture, and the whole titrated with normal caustic soda. The difference in the number of c.c. consumed in the two titrations multiplied by 0·156 gives the amount of menthol in the oil. The whole operation only takes fifty minutes.

### OIL OF WINTERGREEN

Oil of wintergreen, or Gaultheria oil, is obtained from the plant *Gaultheria procumbens*, which grows wild in North America. It has a very agreeable odour, and when pure is quite white, otherwise green.

The best method of preparing this oil by artificial means is that of Thayer:—

505·470 grams of salicylic acid and 690·850 grams of methyl alcohol are weighed out, the former being added in small portions to the latter in a wide-necked flask until a saturated solution is obtained. The flask is then connected with a reflux condenser and the contents heated to boiling point, after which the liquid is completely saturated with dry hydrochloric acid gas. The flask is next disconnected from the condenser, and the contents are treated with about 10 grams of salicylic acid, whereupon it is again connected up and the solution saturated afresh with gaseous hydrochloric acid. This procedure is repeated until the whole of the weighed-out quantity of salicylic acid has been consumed, after which the current of gas is passed through the apparatus for about two hours longer. The contents of the flask will then be found to have separated into two distinct layers, the under one being a dark brown oily liquid. The supernatant liquid is poured off, and the oil washed with water until it ceases to redden litmus paper, after which it is distilled by steam. The excess of water is removed from the oil by means of a separating funnel, and the product is then thoroughly dried with anhydrous calcium chloride. The salicylic acid used for this process has a melting point of 156-157° C., and is dried at 100° C. The methyl alcohol boils between 58° and 72° C., and has the density 0·820. Special care must be bestowed on the drying of the hydrochloric acid gas. Thayer found it necessary to first pass the gas over anhydrous calcium chloride, and then through three vessels filled with sulphuric acid. The yield obtained from the foregoing quantities of materials was 500 grams of a colourless or slightly yellow oil, of agreeable odour, a sp. gr. of 1·187, and a boiling point of 221° C.

The natural oil contains, in addition to methylsalicylic ether, a terpene, gaultherilene.

Theoretically, the artificial oil of wintergreen is identical with the natural oil in chemical composition; nevertheless, it contains traces of alcohol derived from the component used, and difficult to eliminate. If such an oil be treated with a small quantity of spirit aniline red, the latter dissolves in the artificial oil and imparts a red coloration thereto, whereas it is left undissolved by the natural oil. At the end of about fifteen to thirty minutes the colour of the dyestuff undergoes a partial change to purple red in the artificial oil, but in the natural oil it is cherry red. In mixtures, the colour varies between these limits, according to the proportion of the natural and artificial oil present.

### SAFROL

Safrol distils from ethereal oil of sassafras between 230° and 236° C. It forms readily deliquescent monoclinic crystals, has an odour of sassafras, is insoluble in water, boils at 228° C., and has the sp. gr. 1·114.

According to Schimmel & Co., safrol is the cheapest scent for soaps that can be imagined, no other ethereal oil being similarly capable of removing or masking the disagreeable fatty smell of ordinary soaps. It may also be used in many ways for better classes of soap, advantageous and cheap compositions being practicable with this perfume and the oils of cassia, citronella, lavender, rosemary, spike lavender, thyme, and mint.

### IONONE

The creeping rhizome of the Florentine sword lily, the so-called violet root, exhibits a pungent but agreeable odour of violets. The crushed roots furnish on distillation a pale rose-coloured oil, which, at the ordinary temperature, deposits crystalline scales of nacreous lustre, and must therefore be regarded as violet-root camphor. This product is rarely met with in commerce, but there is now prepared by synthetic means a substance having the same odour as violet root, and the dilute alcoholic solutions of which are sold in ionone.

The odoriferous principle of the violet root cannot be obtained direct by steam distillation, a circumstance undoubtedly due to the high percentage of starch present, which seems to restrain the escape of the volatile constituents. For this reason Tieman and Krueger extract the roots repeatedly with ether, and subject the ethereal extract to distillation by steam. The result of these operations is the recovery of two products, one of which is a muddy residue, which, when treated with alkalis, furnishes myristic acid, or iridic acid, and a brittle crystalline resin. The distillate contains the volatile portions, consisting of the ethereal oil, together with a larger quantity of myristic acid and its methyl salt, oleic acid and an ester of same, aldehydes, and other substances. The ethereal solution of this mixture is shaken up with a 2 per cent. solution of caustic potash, in order to eliminate a portion of the free organic acids. The residual organic acids and the esters are more easily removed by repeated fractional distillation of the oil by the aid of steam. The neutral oil obtained by this method is then dissolved in alcohol, and treated with an alcoholic solution of potash at the ordinary temperature, the resulting alkaline solution being then poured out into water, the aqueous solution extracted with ether, and the ethereal solution again subjected to distillation. The iris perfume passes over with the first portion of the distillate, and is then boiled with water and $Ag_2O$. This clarifies the irisketone by the formation of a phenylhydrazine compound, and after leaving at rest for a day, the hydrazine mixture is distilled by steam. The irisketone remains behind, in combination with the phenylhydrazine, as a brown oil, which is then decomposed by dilute sulphuric acid in phenylhydrazine, and irisketone or ionone. This is next extracted from the aqueous portion by ether, and rectified under slight pressure. Ionone is an oil which is only sparingly soluble in water, but readily so in alcohol, ether, chloroform, benzol, and ligroin (light petroleum spirit), and has the sp. gr. 0·939. The odour of pure ionone is pungent, and in the concentrated condition not at all like that of violets; but when diluted with alcohol and exposed to the air, it immediately resembles the natural scent of the violet blossom.

Artificial oil of violets is prepared in the following manner, according to an American patent:—One kilo of acetone and ½ kilo of citral are dissolved in 1½ kilos of alcohol, and to the solution is added 1 litre of a freshly prepared clear saturated solution of calcium chloride. The mixture is kept stirred, and is heated for several hours under a reflux condenser, the resulting oil being afterwards boiled in 5 litres of a dilute solution of ferric chloride, and finally distilled. The citral or citraliferous oils may also be treated, in the acetone-alcohol mixture, with an efficient oxidising agent like barium peroxide, and then further oxidised by boiling with ferric chloride.

### THYMOL

Thymol is found in the ethereal oil from *Thymus vulgaris*, *Monarda punctata*, *Ptycholis Ajowan*, and is obtained by agitation with caustic soda and precipitation with hydrochloric acid. It forms colourless tables, has an odour of thyme, a pungent aromatic flavour, melts at 50° C., and boils at 232° C.

Thymol is only sparingly soluble in water, but readily so in alcohol and ether. Water can only retain 1 part of thymol per 1000 in permanent solution; but strong alcohol will take up its own weight of thymol. On the addition of water to the solution, the greater part of the thymol is deposited, turbidity being produced by water when the alcoholic solution is stronger than 1 per cent. One part of thymol is soluble in 120 parts of glycerin, and the solution still remains clear when diluted with water to 600 parts. Fats and oils, as also petroleum jelly, are excellent solvents for thymol, but require warming. In the preparation of salves the thymol is first dissolved in a few drops of alcohol and then added to the fat.

A stable aqueous solution of thymol can be prepared by dissolving 1 gram each of thymol, tartaric acid, and pure dry caustic soda in a minimum of warm water, and diluting the solution with distilled water to 1 litre. This solution will keep for any length of time.

On adding a few drops of caustic potash and a little potassium iodide and iodine solution to a liquid containing thymol, so that the liquid assumes a faint yellowish brown colour, the application of a gentle heat causes the mixture to turn red, the colour deepening by degrees. On strong heating, or prolonged standing, the coloration disappears and a precipitate is formed. By means of this reaction, as *little* as 0·05 mg. of thymol in 1 c.c. can be detected through the resulting red colour.

### BISMUTH WHITE

Bismuth white, also known as blanc de bismuth, blanc de perles, and pearl white, which is a basic nitrate of bismuth, and at the same time a constituent of several face cosmetics, is prepared by the action of fuming nitric acid on metallic bismuth. During this reaction a large volume of suffocating brown fumes are evolved, and this continues until the bismuth is completely dissolved. When the reaction has terminated, the solution is diluted with a large volume of water, the resulting precipitated powder being then collected on a filter and washed with water until the washing ceases to redden blue litmus paper. The bismuth white is dried and stored in tightly closed vessels, since, on exposure to the air, it gradually assumes a yellow tinge from the absorption of sulphuretted hydrogen, for which substance it has a great affinity, and with which it forms a black compound, bismuth sulphide.

Basic bismuth nitrate is insoluble in water, but has a tendency to become altered in composition on prolonged digestion with a large volume of water, especially in the warm, inasmuch as it becomes more basic and the acid washing water absorbs bismuth. It is soluble in moderately dilute sulphuric acid, nitric acid, or hydrochloric acid, the resulting solutions being turned cloudy by the addition of water.

### TIN OXIDE

Tin oxide is obtained by treating metallic tin with fuming nitric acid and then levigating the product. It is a white insoluble powder, and is employed in cosmetics for polishing the finger nails.

### CALCIUM CARBONATE

Calcium carbonate, or levigated chalk, is prepared in the following manner:—One part of calcium chloride is dissolved in 15 parts of distilled water, filtered, and the filtrate treated with a previously filtered solution of soda crystals in distilled water, until a precipitate ceases to form. The resulting fine white deposit is precipitated chalk. When this has completely settled down, the supernatant liquid is poured off, and the precipitate, moistened with a little distilled water, is transferred to paper filter in a funnel, and washed six or eight times with the wash bottle, after which it is dried by moderate warmth.

Calcium carbonate is almost entirely insoluble in water. According to Bineau, 1 litre of pure water can dissolve 0·016 gram of chalk; Welzien, however, gives the quantity as 0·036, Hofmann 0·034, and Cruse 0·036 gram. When freshly precipitated, it is more soluble in water containing ammonium chloride, and still more so in water containing carbon dioxide. In the latter case, according to some, calcium bicarbonate is formed; but, according to others, the monocarbonate is dissolved as a neutral salt, Lassaigne giving the amount as 1 part in 1136 parts of water at 10° C., and Warington as 1 in 1015 parts of water, saturated with carbonate, at 21° C. Calcium carbonate is decomposed by acids, carbon dioxide being liberated.

## ANIMAL SUBSTANCES USED IN THE PREPARATION OF COSMETICS

### AMBERGRIS

Ambergris is a greyish brown mass found floating in the tropic seas; it occasionally contains remains of marine animals, and is regarded as a kind of gall stone or intestinal concretion of the sperm whale. It is lighter than, and insoluble in, water, but soluble in alcohol, ether, oils, alkalis, or ammonia; softens in the hand, has an agreeable odour when warmed, and burns with a smoky flame. It contains 85 per cent. of fat, and, when distilled with water, gives about 13 per cent. of a sweet-smelling oil.

### CASTOREUM

Castoreum is a secretion of the beaver, and is deposited in two pear-shaped sacs situated on the belly in both sexes. The beaver hunters separate these sacs from the carcase, and in this form the castoreum is brought to market. The sacs are about as long as the finger, and of the thickness of a man's thumb in the widest part; they contain a salve-like mass, which is yellow-brown, red-brown, or blackish, according to the food of the animal. It has a strong, disagreeable smell, a bitter balsamic taste, softens when warmed, is combustible, and is for the most part soluble in alcohol. Probably this secretion has some connection with the feeding of the beaver, which preferably consumes resinous plants when any selection is available.

In commerce a distinction is drawn between Canadian and Siberian castoreum; the latter is the more highly prized, and exhibits a peculiar odour of tar and Russia leather, probably due to the presence of certain constituents in the birch bark on which the Siberian beavers feed almost exclusively. American castoreum has an odour more recalling that of pine bark.

### MUSK

Musk is obtained from the musk deer, an animal about the size of a goat, and living after the manner of the chamois in the high peaks of the Himalayas. The male alone secretes musk, which is found stored in a kind of sac, or more properly, gland.

Quickly-dried musk loses its odour almost entirely, and the same occurs when it is rubbed down along with *sulphur præcipitatum*, camphor, etc.; but the scent gradually returns when the musk is again moistened.

A good sac should contain 50-60 per cent. of musk, and no artificial seam should be apparent on the surface. Admixtures of blood are detected by a putrescent smell on moistening the musk with water. Added starch is revealed by the iodine test. Additions of metallic fragments, small stones, strips of leather, resin, etc., are often made, in order to increase the weight; the presence of these and similar objects can be detected by the naked eye or by the aid of a magnifying glass. In pure musk, the microscope reveals irregular whitish brown granules, along with cells, drops of oil, and generally also the mycelial threads of fungi.

Pure musk exhibits a highly characteristic behaviour towards caustic alkalies, such as soda, potash, or liquid ammonia, and these substances are therefore employed as tests for purity. On suffusing a sample of musk with a dilute solution of an alkali, a considerable intensification of the odour will become evident within a short time; if the alkali be concentrated or the sample warmed, the smell of musk disappears entirely, and the liquid evolves the pungent odour of pure ammonia. Hot water dissolves about 80 per cent. of the total weight of musk, strong alcohol about one half. When heated in an open porcelain basin, musk burns with liberation of a repulsive, empyreumatic smell, and leaves behind about 10 per cent. of ash.

To get rid of the smell of musk from a vessel in which that substance has been stored, it is sufficient to rub the inner surface over with bitter almonds moistened with water, or camphor moistened with alcohol. The smell may also be entirely removed by means of potassium permanganate.

A method for preparing musk by artificial means was devised by Bauer in 1889. He mixed toluol with the halogen compounds of butane, and boiled the mixture, with an addition of aluminium chloride or bromide, under a reflux condenser. The product of the reaction is mixed with water and distilled with steam, the fractions passing over at 170-200° C. being collected and treated with fuming nitric and sulphuric acids. The resulting product is washed with water and recrystallised from alcohol, and furnishes yellowish white crystals, smelling strongly of musk; these, when dissolved in alcohol and treated with a trace of ammonia or ammonium carbonate, yield a liquid very similar to musk tincture.

According to the Valentiner process, a musk substitute can be obtained from turpentine. In this method, equivalent quantities of turpentine and isobutyl alcohol are mixed, and then gradually run into a five- to eightfold quantity of concentrated sulphuric acid, arrangements being made for cooling the whole. After one to two hours the mixture is poured into 5-10 times its volume of concentrated fuming nitric acid,—the necessary precautions being observed,—and then poured out into a large quantity of water. The nitro product is thrown down as pale yellow flakes, which are then collected on a filter and washed until neutral. The dried product forms a light yellow powder, with a strong smell of musk. The intermediate product from turpentine, isobutyl alcohol, and sulphuric acid, when thrown down with water, forms a thick whitish mass, which, when treated with steam, furnishes a trace of unattacked turpentine and alcohol, the remainder being non-volatile. It is soluble in all solvents except water; the product is probably of the nature of a dipentene. The final product, the pale yellow, nitrited, musky substance, is probably chiefly a dinitro product mixed with a little mononitro substance; it melts at about 70° C., and, on recooling, forms a brittle, pulverulent mass.

Later on—1892—Valentiner prepared a musk substitute which is soluble in both alcohol and water. This should open a wide field of usefulness to the product. The solubility in water is attained by nitrating a sulpho acid of butylxylol. Isobutyl alcohol and acetoxylol (B.P. 137° C.) are mixed in equivalent proportions, and gradually run into 5 parts of concentrated sulphuric acid (66° Be.), the whole being kept cool in order to prevent the evolution of sulphurous acid. After a short rest, the mixture is diluted with about a fourfold quantity of water, to separate the still unattacked condensation product; the latter collects as an oily layer on the surface of the liquid, and is removed when the separation is complete. The underlying clear, aqueous, rose-red liquid is treated with a saturated solution of common salt, in order to recover the paraisobutylxylol sulphonic acid, until the contents of the flask become in a short time interspersed with white crystals. These are collected by filtration, purified by recrystallisation, pressed, and dried at 100° C.

Another artificial musk is prepared by Link and Avenarius. Isodibutylene and halogen acids are heated with toluol, or with m-xylol, ethylbenzol, and similar substances, in presence of ferric chloride or bromide, whereupon tertiary butyltolylmethane, polymeric propylenes, as well as isopropyltoluol and homologues of this substance, are formed. The hydrocarbons are distilled with steam, dried, and fractionated, in order to separate the tertiary butylpropylmethane and the hydrocarbon $C_{15}H_{24}$ or its homologues. These products are then transformed into the corresponding trinitro derivatives, by heating them with nitric acid of sp. gr. 1·525 and fuming sulphuric acid, on the water bath. By removing the free acid and recrystallising from alcohol, these nitro compounds are obtained in the form of pale yellow crystals, exhibiting a musky odour.

### CIVET

Civet is yielded by a civet cat, a carnivorous animal allied to the ordinary cat and the marten, and indigenous to Asia and Africa; also by the musk rat. It is secreted in a double gland, found in both sexes.

Fresh civet is a whitish yellow mass, of the consistence of butter or fat, but turning thick and brown on exposure to the air. Like musk, it is characterised by a very powerful odour, which, as in the case of musk, becomes agreeable when largely diluted, and is used both alone and for the purpose of fixing other perfumes.

### CARMINE

Cochineal or carmine consists of the dried bodies of the female cochineal insect; and the commercial article takes the form of rounded, shrunken granules ranging in size up to that of a pea. The colour of the granules depends on the means employed for killing and drying the insects. If killed by hot water, the cochineal loses its ordinary white encrusting film, and has a reddish brown appearance. Drying in linen bags in a stove furnishes grey cochineal; and, finally, black cochineal is obtained by drying on hot stove plates. The colouring principle in cochineal is carminic acid, which is purple brown, and can easily be rubbed down to a red powder. It is very soluble in water or alcohol, but scarcely so, if at all, in ether. Caustic alkalis change the colour of the aqueous solution to purple red, and lead acetate produces a purple precipitate.

Cochineal is adulterated in a variety of ways, spent cochineal, according to Prior, being dried and mixed with fresh. In order to restore the original colour to spent cochineal, it is dried in drums containing heavy spar, talc, clay, gypsum, or white lead, whereby the white silky coating is imitated. Suspected samples of this character may be tested by treating them with water, whereupon the mineral matter is readily loosened from the cochineal, and can be separated by decantation for further examination. The presence of these mineral adjuncts can also be detected in the ash. Artificial granules, resembling true cochineal in form and colour, can also be discovered by the water treatment, since they crumble down in water, whereas true cochineal retains its shape. Adulteration with the colouring matter of redwood can easily be revealed by the aid of lime-water, a dilute aqueous extract being thereby entirely decolorised in the case of pure cochineal, but retaining a violet blue tinge when redwood extract is present. The value of cochineal may also be determined volumetrically, by rubbing down the preparation to fine powder, mixing this with a white substance, and comparing the amount of the latter necessary to produce the shade of colour furnished by a standard cochineal treated in the same way with a known quantity of white.

The best method, however, is by a sample dyeing. On the other hand, methods based on the destruction of the colour in an extract, by oxidising agents like chlorine, etc., furnish only dubious results, since these reagents produce similar changes, not only in the colouring matter, but also in other constituents present in the aqueous extract.

Carmine is a red dyestuff, sold in lumps, powder, or dissolved in isinglass or egg albumin, and is usually prepared by precipitating a decoction of cochineal with an acid or an acid salt. By reason of its high price, it is frequently subjected to adulteration; and it has been found to contain admixtures of starch, clay, brickdust, etc. As pure carmine is completely soluble in ammonia, whereas these adulterants are insoluble therein, ammonia forms an excellent reagent for their detection.

To test a liquid for the presence of carmine, it is shaken up with 1 vol. of chloroform and 3 vols. of absolute alcohol; on then adding 2 vols. of distilled water to the mixture, without shaking, the carmine will separate out, almost in its entirety, at the plane of contact between the two layers of liquid. In the case of a fuchsine solution of equal strength, the whole of the colouring matter will be found in the layer of chloroform. Other colouring matters, however, are deposited at the plane of contact in this test, though very few pass completely into the chloroform. The colouring matters in most general use behave in the following manner:—

Elderberry. The bulk of the colouring matter remains in solution, imparting a rose-red coloration to the upper layer of liquid, and a faint yellow to the chloroform mixture. Both layers are turned green by the addition of ammonia.

Campeachy wood extract. A violet deposit is formed, the upper layer being coloured. On the addition of ammonia the upper layer turns red, the lower one violet.

Red Rose. The colouring matter is yellowish red, and gives a complete blue-violet precipitate.

Ratanhia extract. A very small brown deposit.

Red currant berries. The colouring matter is deposited, almost completely, as a rose-red precipitate.

Cochineal. A violet ring is formed, accompanied by partial deposition of the colouring matter.

Red wine. A rose-red ring is formed; an addition of ammonia turns the upper layer dirty yellow.

Raspberry. A rose-red ring on addition of ammonia.

Madder red. A red deposit; the chloroform mixture turns yellow.

Alkanna red. The colouring matter passes into the chloroform layer, and is turned blue by ammonia.

Santal wood. The colouring matter forms a yellowish red solution in the chloroform mixture. Ammonia decolorises the upper layer, whilst the chloroform layer is perfectly colourless.

# CHAPTER IV

## OILS AND FATS USED IN THE PREPARATION OF COSMETICS.

AJOWAN OIL, from the fruit of the umbellifer *Ptycholis Ajowan*, indigenous to India, is distinguished for its high percentage of thymol, for the preparation of which it is employed. The oil contains 30-40 per cent. of thymol, 30-40 per cent. of thymene, 15-20 per cent. of cymene, and a little carvacrol.

### BAY OIL

Bay oil, from the foliage of the West Indian myrtle, is a thin, yellow-brown, sweet-smelling oil, consisting of a terpene with 30-40 per cent. of eugenol. It is largely used in America for the preparation of bay rum.

### BERGAMOT OIL

Bergamot oil is largely prepared in Italy, and especially Sicily, by pressing the rind of the fruit of *Citrus bergamia*. It is a very fluid ethereal oil, of pale yellow colour, the poorer qualities being often greenish or brownish, but obtained perfectly clear and colourless by distillation with water. The odour is highly agreeable, resembling a mixture of the oils of orange and lemon, and the sp. gr. is 0.87-0.89. On prolonged standing it deposits white crystalline tables of stearoptone, which do not melt below 206° C. It solidifies a few degrees below the freezing point of water.

The most highly prized quality is Messina oil. It differs from the other oils of the orange tribe by its ready solubility to a clear solution in caustic potash; but it shares with them the property of igniting with iodine, and being incapable of dissolving santaline, the red resinous colouring matter of santal wood.

The purity of bergamot oil can be tested by treating it with alcohol, whereupon it turns pale grey and gives a firmly adherent deposit, which collects in flakes when shaken up. After two days, the solid sediment is inappreciable in quantity, and is difficult to disseminate in flakes in the clear yellow liquid when shaken. The oil being often adulterated with alcohol, the following method for its examination has been recommended:—Fifteen parts of the bergamot oil are mixed with an equal volume of olive oil, or oil of sweet almonds; if alcohol be present, it will separate from the fatty oil like water; if, however, the mixture remain unaltered, one may be certain that the sample has not been adulterated with alcohol. The tannin test also gives reliable results.

### BIRCH-TAR OIL

Birch-tar oil is the liquid portion of the tar furnished by the dry distillation of birch wood, and consists of a mixture of numerous hydrocarbons. It is used as Russia leather oil.

### OIL OF BITTER ALMONDS

The ethereal oil of bitter almonds is obtained by distilling with water the crushed bitter almonds previously freed from their fatty oil by pressure. It chiefly consists of benzaldehyde, but also contains small quantities of benzoic acid, benzoin, etc., and is very poisonous, owing to the presence of 2-5 per cent. of hydrocyanic acid, from which, however, it can be freed by agitation with a solution of ferrous sulphate and slaked lime. The originally yellow oil can be entirely decolorised by distillation over quicklime. It is a thin, highly refractive oil, with a peculiar, agreeable odour, and a pungent aromatic flavour. The sp. gr. at 15° C. is 1·043, the boiling point is 180° C.; it is soluble in 30 parts of water, and dissolves readily in alcohol and ether. On exposure to the air it is oxidised into benzoic acid.

The usual adulterants are: nitrobenzol, alcohol, and light ethereal oils. These, however, have already been dealt with.

### CAMPHOR

Camphor is the customary name for a special form of camphor—laurel camphor—which is derived from the tree *Camphora officinarum,* and is the only kind appearing in European markets. It is shipped in the crude state from the producing countries, China and Japan, and is refined in Europe and America. The refined camphor is the only kind met with in the retail trade, though in different degrees of purity. Chinese camphor comes from Formosa, where the camphor trees cover the mountain chain extending from north to south; the eastern provinces of Central China also furnish camphor. Japan produces about the same quantity as Formosa.

Crude camphor is generally of a greyish colour, the Japanese product, which is usually of higher quality, having a reddish tinge. The impurities amount to 6-10 per cent., though the better Japanese grades have only about 2 per cent. Camphor oil is never absent, and the same applies to a little incombustible matter. Bad qualities contain wood splinters. Among the impurities are also gypsum, salt, and sulphur, all of which are easy of detection. All crude camphor naturally also contains water.

Pure camphor melts at 175° C., and boils at 204° C., but also sublimes at the ordinary temperature, as is proved by the crystals deposited on the walls of vessels in which camphor is stored. The crystals are hexagonal, and take the form of tables and prisms when crystallisation proceeds in an unrestricted manner. It is readily dissolved by the solvents of resins, and also in concentrated acetic acid, but is almost insoluble in water, one part of camphor requiring over 1000 parts of water for its solution (1800 parts at 20° C.). The alcoholic solution deviates the plane of polarised light strongly to the right. The crystals exhibit double refraction. At 12° C. the sp. gr. is 0·995, but at 6° C. (and under) the density is almost exactly the same as water, so that camphor crystals hardly sink at all in very cold water. A remarkable property of pure camphor is that of describing circular movements on the surface of water, this peculiarity being absent in camphor oil or impure camphor. Unless moistened with alcohol or other solvent, camphor is only triturable with great difficulty. The flavour of pure camphor is aromatic and rather bitter, warming at first, but cooling afterwards. It is easily ignited, and burns with a smoky flame.

The following method of preparing camphor powder has been patented by B. Smith, of New York:—The camphor is dissolved in petroleum ether or benzine, then left to settle, the solution poured off, filtered if necessary, and the solvent expelled by distillation, until the camphor begins to crystallise from the hot solution, whereupon the distillation is suspended and the solution is stirred until cold. The more the crystallisation is interrupted, the finer the powder. The camphor powder prepared in this manner does not ball.

Grated camphor powder is better than that obtained by rubbing down camphor moistened with a solvent, inasmuch as it does not ball together, and is uniformly loose, though coarse in texture. It, however, fulfils its purpose, since it can be easily rubbed down to the finest powder when required, as well as being suitable for rapidly preparing solutions of camphor in oil, ether, spirit, etc.

Up to the present no adulterants have been detected in camphor.

### LEMON OIL

Lemon oil is obtained by pressure or distillation from the skins of *Citrus medica* and *Citrus limonum*, and is a thin ethereal oil, colourless or yellowish, with an agreeable odour and taste. The sp. gr. is 0·840-0·870. Old oil has an acid reaction, sharp smell, and sharp, burning flavour. Pressed oil is of a yellowish colour, rarely quite clear, and deposits a thick sediment on standing; the distilled oil is colourless and clear, but of less agreeable taste and smell. The two are mixed together for sale.

Lemon oil is miscible with alcohol in all proportions, and dissolves, to a not perfectly clear solution, in two parts of alcohol of sp. gr. 0·815, or ten parts of alcohol of sp. gr. 0·830. It ignites with iodine. In commerce it is frequently adulterated with turpentine, the presence of which can be detected by the smell when a few drops of adulterated oil are rubbed between the hands. One drop of lemon oil, rubbed with sugar and added to 500 grams of water, should impart to the latter the pure odour of lemons. No alcohol should distil over when the oil is heated to boiling in a retort.

### LEMON-GRASS OR CITRONELLA OIL

Citronella oil, an ethereal oil prepared from lemon grass in Ceylon, is fairly thin, greenish yellow to brown, and has an odour like that of narcissus oil.

Pure unadulterated citronella oil should dissolve to a clear solution in 2 parts of 80 per cent. alcohol, which it will not do if adulterated with turpentine.

### EUCALYPTUS OIL

Eucalyptus oil is an ethereal oil extracted from the leaves of various eucalypti. According to Merck, there are two entirely separate kinds of eucalyptus oil: (1) Oleum eucalypti australe, which is a comparatively cheap oil, used for technical purposes; (2) Oleum eucalypti, from the leaves of *Eucalyptus globulus*, an oil for medicinal purposes, and much dearer than the first-named kind. The means of distinguishing between the two kinds consist—in addition to the smell, which in the case of the oil from *E. globulus* is agreeable and like that of the rose, whereas the cheaper oil smells more like turpentine —in the following characteristic indications;—(1) The Oleum eucalypti australe is strongly levo-rotatory, whilst the true oil and its preparations are either slightly dextro-rotatory or optically inactive. (2) Whereas Oleum eucalypti australe is only very slightly soluble in 90 per cent. alcohol, and gives merely a turbid solution in the proportions 1 : 15, the oil from *E. globulus* and the preparations from same (eucalyptol) dissolve with this alcohol in all proportions—even 1 : 1—to a perfectly clear solution. The Australian oil is also soluble in absolute alcohol. (3) Oleum eucalypti australe ignites when treated with iodine, but the true oil does not. (4) The former assumes a red colour, the latter a yellowish tinge, when exposed to the action of sodium. (5) The sp. gr. of Oleum eucalyptus australe is above 0·860-0·870, whereas the density of the true oil varies according as it has been prepared from old or fresh leaves, but is in any case higher than that of the other, namely, 0·900-0·925.

### OIL OF LAVENDER

Oil of lavender is prepared in the South of France from the wild *Lavendula officinalis*, by distillation, in large quantities. It is a thin, colourless to yellow oil, miscible in all proportions with 90 per cent. alcohol, and having a density of 0·876-0·901. The best French oil of lavender, prepared solely from selected flowers, is sold as "Essence de Lavande Mont Blanc," and is distinguished from the other qualities—in the preparation of which a larger or smaller proportion of stalks and leaves accompany the blossoms—by its exceedingly agreeable odour. The chief adulterants of oil of lavender are alcohol, turpentine, and oil of spike lavender. The purity of the article is tested by mixing one drop with 10 c.c. of warm water and smelling the mixture, which should exhibit a pure and agreeable odour of lavender. The flavour of the mixture is momentarily bitter and aromatic. One volume of the oil should give a turbid solution with an equal quantity of dilute alcohol (sp. gr. 0·896), but a perfectly clear mixture with 3 vols. of same. On shaking up ½ c.c. of the pure oil with a few granules of rosaniline, the liquid will remain colourless; but if alcohol be present a red coloration is developed.

Oil of spike lavender is distilled in the South of France from the flowers and leaves of *Lavendula spica*. It is colourless or yellow, and resembles oil of rosemary rather than lavender in smell.

Oil of spike lavender should mix to a clear liquid with its own volume of 90 per cent. alcohol, the contrary indicating the presence of turpentine as an adulterant.

### PEPPERMINT OIL

Oil of peppermint is an ethereal oil, obtained by distilling the flowers and other portions of the plant, *Mentha piperita*. The oil from the leaves is of superior odour and flavour to that from the whole plant. The three chief commercial kinds of this oil are the English, German, and American, the first named being the best, and that from Mitcham (Surrey) the best of all. The best marks of American oil are those of H. G. Hotchkiss, L. B. Hotchkiss, and Hale & Parshall.

Pure peppermint oil of good quality is neutral, thin, water-white to pale yellow, occasionally with a greenish sheen; exhibits a pure, penetrating odour of peppermint, and a burning, bitter taste, leaving behind a feeling of coldness on the tongue. It thickens with age, and acquires an acid reaction. The sp. gr. is 0·000-0·920. The oil gives clear mixtures with equal and larger volumes of 90 per cent. alcohol; also a turbid mixture with its own volume of benzine, but a fairly clear mixture with 9-10 vols. Benzol gives turbid mixtures; both those with ether, chloroform, and amyl alcohol are clear.

The following adulterants are added to peppermint oil: fatty oils, alcohol, turpentine, copaiba oil, oil of mustard, and ginger oil. On heating over the water bath a piece of blotting paper moistened with one drop of the oil, the greasy mark will disappear entirely if the oil be pure, and will cease to be apparent even by transmitted light. When fatty matters are present, the grease mark, though seemingly absent when viewed by reflected light, will always be visible with transmitted light. When the oil contains more than 3 per cent. of alcohol, it is sufficient to let 1-2 drops fall into water, whereupon the drops will either be immediately surrounded by a milky zone, or will soon become whitish or cloudy in contact with the water. The most frequent adulteration is an addition of turpentine, which may then be recognised by the fact that, whilst pure peppermint oil gives a clear mixture with an equal volume of 90 per cent. alcohol, this is not the case when turpentine is present. To test for copaiba oil, 5 drops of the oil are treated with 15-20 drops of fuming nitric acid, shaken up, and set aside for one to two hours. At the end of this time the oily portion must still be liquid and not have solidified at all. To test for traces of mustard oil, 10 drops of the oil are placed in a wide test glass, along with 3-4 c.c. of absolute alcohol, 2-3 drops of silver nitrate solution, and 10-15 drops of ammonia. The mixture should remain clear and colourless, even when heated to boiling point; whereas if mustard oil be present, turbidity and blackening ensue on the application of heat, owing to the formation of liver of sulphur. After boiling, the solution is left to stand for two or three hours; if, at the end of that time, reduction, expressed by a greyish turbidity, has occurred, the sample is adulterated with another ethereal oil.

### OIL OF CLOVES

The volatile oil of cloves is obtained by distillation with superheated steam, or by extraction. It is a clear, colourless, yellowish or yellow-brown oil (reddish brown when aged), somewhat thick, of sp. gr. 1·030-1·065; it exhibits a strong smell of cloves and a similar burning taste. It frequently has a faintly acid reaction, boils at 250° C., and is readily soluble in alcohol or ether.

The adulterants of clove oil are: alcohol, oil of cinnamon, sassafras oil, oil of thyme, and paraffin oil. According to Hager, they may be detected in the following manner:—1. The sp. gr. and alcohol test consists in letting fall a few—5—drops of oil of cloves on to a column (about 10 c.c.) of 5 per cent. brine in a test tube. If the drops sink to the bottom of the glass, on gentle agitation, without becoming turbid or surrounded by a turbid cloud, it may be concluded that no alcohol is present, and that the sample has the right sp. gr. On closing the test glass with the thumb and slowly turning it upside down twice, so that the oil drops are compelled to traverse the column of water again, the drops usually cease to retain their limpidity. 2. Fifteen drops of the oil are mixed with 15 c.c. of water, shaken up, warmed to about 50° C., shaken up again and filtered. The filtrate should hardly exhibit any acid reaction indicative of salicylic acid or oil or cinnamon. 3. The same filtrate is cooled down and passed twice through a paper filter, to make it perfectly clear. One half is then treated with 2-3 drops of ferric chloride solution, whereupon a blue or green coloration indicates carbolic acid or salicylic acid. The milky turbidity produced by ferric chloride in the filtrate is pale violet, bluish, yellowish, or pale greenish, in the case of pure oil, but dark green to blue in presence of carbolic acid or phenol. Should alcohol be also present as an adulterant, a lighter coloration may be expected. The other portion of the same filtrate should, when treated with half its volume of sulphuric acid, furnish a raspberry-coloured liquid. 4. Half a c.c. of the oil should give a clear mixture with an equal or larger quantity of alcohol, turbidity indicating the presence of paraffin oil. If the clear mixture with 10 vols. of alcohol be divided, and the one half—3-4 c.c.—be treated with several drops of sulphuric acid, the other with 1-2 drops of ferric chloride solution, a blue or violet-blue coloration should be developed in both cases. In the ferric chloride test, old clove oil will generally give a green mixture. 5. Carbon bisulphide should give a very turbid mixture. 6. Pure oil of cloves should give a clear mixture with 2-3 vols. of 60 per cent. alcohol. In presence of castor oil and other fatty oils, paraffin oil, sassafras oil, or cinnamon oil, a turbid mixture would ensue. 7. On mixing 50 drops of the oil with 1 drop of water, warming up to 40-50° C. and shaking, a clear mixture will be obtained when the oil contains crystallised phenol. In such event the oil gives a fairly clear mixture with a fivefold volume of benzine. Should anhydrous phenol be present, the mixture will be white, turbid, and non-transparent, whereas pure oil gives an opalescent but still translucent mixture. When, therefore, the oil gives with benzine a nearly clear, or a non-transparent, whitish, turbid mixture, it may also be suspected as adulterated.

In testing ethereal oils, the results obtained by Schimmel & Co., of Leipzig, in this connection are worthy of attention. The solubility of these oils in alcohol furnishes the main criterion of their value, and of adulteration. According to the determinations made by the above-named firm, 1 part by volume of—

| | | | | | |
|---|---|---|---|---|---|
| Aniseed oil | dissolves in | 1½—2 | parts of | 90 | per cent. alcohol. |
| Bergamot oil | ,, | ¼—½ | ,, | 90 | ,, |
| Cajeput oil | ,, | 3—5 | ,, | 70 | ,, |
| Calamus oil | ,, | all proportions | of | 90 | ,, |
| Cassia oil | ,, | 1—2 | parts of | 80 | ,, |
| Citronella oil | ,, | 1—2 | ,, | 80 | ,, |
| Lemon oil | ,, | 5 | ,, | 90 | ,, |
| Eucalyptus oil | ,, | 3—5 | ,, | 70 | ,, |
| Fennel oil | ,, | 5—8 | ,, | 80 | ,, |
| Geranium oil | ,, | 2—3 | ,, | 70 | ,, |
| Curly mint oil | ,, | equal | ,, | 90 | ,, |
| Caraway oil | ,, | 3—10 | ,, | 80 | ,, |
| ,, | ,, | equal | ,, | 90 | ,, |
| Lavender oil | ,, | 3 | ,, | 70 | ,, |
| Mace oil | ,, | 3 | ,, | 90 | ,, |
| Clove oil | ,, | 2 | ,, | 70 | ,, |

| | | | | | |
|---|---|---|---|---|---|
| Orange flower oil | dissolves in | 1½—2 | parts of | 80 | per cent. alcohol. |
| Palmarosa oil | ,, | 3 | ,, | 70 | ,, |
| Patchouli oil | ,, | equal | ,, | 90 | ,, |
| Peppermint oil (American) | ,, | ,, | ,, | 90 | ,, |
| Peppermint oil (England and Japan) | ,, | 3—5 | ,, | 70 | ,, |
| Rose oil | ,, | equal | ,, | 90 | ,, |
| ,, (liquid portion) | ,, | ,, | ,, | 70 | ,, |
| Rosemary oil | ,, | ½ | ,, | 90 | ,, |
| Santal wood oil | ,, | 5 | ,, | 70 | ,, |
| ,, (East Indian) | ,, | 3 | ,, | 90 | ,, |
| ,, ,, | ,, | 1—2 | ,, | 80 | ,, |
| Thyme oil | ,, | 15—30 | ,, | 70 | ,, |
| Wintergreen oil | ,, | 5 | ,, | 70 | ,, |
| Ylang-ylang oil | ,, | 1—2 | ,, | 90 | ,, |

## PATCHOULI OIL

Patchouli oil is an ethereal oil obtained from the leaves and twigs of *Pogostimon patchouli* in the East Indies. It is yellowish or brownish yellow, somewhat thick, and about the same density as water, or a little heavier. It is levo-rotatory, boils at 282-294° C., and on prolonged standing deposits an isomeric patchouli camphor in prismatic crystals, melting at 54-56° C., of sp. gr. 1·045, and with a peculiar, penetrating and persistent odour. The commercial varieties comprise a so-called natural patchouli, prepared in the East Indies, a rectified oil, and a so-called crystallised patchouli oil, rich in patchouli camphor. The odour is the same in all three, but that of the latter kind is specially persistent.

Patchouli oil is frequently adulterated with cedar-wood oil, which may be detected by the circumstance that the pure oil is readily soluble in its own volume of 90 per cent. alcohol, whereas the adulterated oil is not.

## JUNIPER OIL

Juniper oil is the volatile oil obtained by steam distillation from the fruit of *Juniperus communis*. It is colourless, of sp. gr. 0·840-0·860; that obtained by ordinary distillation being yellowish, and of sp. gr. 0·85-0·9. The odour is that of juniper berries, and the oil has a burning taste. It has a great tendency to resinify, and then becomes thick and acid. The adulterants are juniper-wood oil and turpentine.

Juniper oil is soluble in alcohol, and gives a clear mixture with carbon disulphide without thickening. No disagreeable taste should be imparted to water when 3 drops of this oil are rubbed down with sugar and shaken up with 500 grams of water. According to Hager, pure juniper oil mixed with 30 vols. of 90 per cent. alcohol gives a somewhat cloudy but still transparent solution, which, when kept in a warm place, becomes lighter, but still remains turbid. With 3-4 vols. of absolute alcohol, of 2-3 vols. of petroleum ether, the oil gives a turbid mixture, but a clear one with chloroform. Adulteration with alcohol is detected by the addition of a little rosaniline, which is indifferent towards juniper oil, but soluble in alcohol.

### YLANG-YLANG OIL

Ylang-ylang oil is an ethereal oil from *Uona odoratissima*, a plant indigenous to the Philippine Islands, and is shipped from Manilla to the European market as a water-white or faintly yellowish liquid. It commences to boil at 160° C., but the boiling point extends to 300° C. The sp. gr. is 0·980. Ylang-ylang oil is a mixture of several oils.

### CINNAMON OIL

Cinnamon cassia oil is the oil recovered, in China and Cochin China, by distilling the rind, unripe fruit, calices, and other waste portions of the cinnamon cassia tree. It has a pale yellow colour, which browns with age, is thick, and has a sweet flavour, with burning after-taste. The sp. gr. is 1·03-1·09. One part of the pure oil is soluble in 2 parts of 80 per cent. alcohol.

The quality of the oil is revealed by the taste, smell (especially when warmed), and by the high sp. gr., which causes the oil to sink in water. According to Hager, cinnamon cassia oil is frequently adulterated with clove oil; but Deite considers this improbable, since clove oil is usually the dearer of the two. On the other hand, it is frequently adulterated with cheaper thick ethereal oils, especially with cedar-wood oil, in which case the solubility differs from the rate given above.

Cinnamon oil, the ethereal oil obtained from the waste of Ceylon cinnamon by distillation with salt water, is golden yellow when fresh, afterwards turning reddish brown; it has a more agreeable odour and taste of cinnamon than cinnamon cassia oil. The sp. gr. is 1·005-1·03.

This oil is adulterated with the cheaper cassia oil, which is very difficult to detect, except by connoisseurs expert in the flavour and odour of the true oil.

### OIL OF ALMONDS

This is the fatty oil of sweet and bitter almonds. According to Deite, the commercial oil is mostly expressed from small, cheap bitter almonds and apricot kernels. There are two chief kinds, English and French, the latter being the cheaper, but of poorer quality. The oil is thin, clear, and of faint yellow colour, with a mild, agreeable flavour, but hardly any odour. The sp. gr. is 0·915-0·920 at 15° C. It solidifies at −20° C., is miscible in all proportions with ether, benzine, and chloroform, and is soluble in 15 parts of absolute alcohol at boiling heat, but requires 60 parts at the ordinary temperature.

Almond oil is adulterated with poppy oil, sesame oil, earth-nut oil, apricot-kernel oil, beech oil, and walnut oil. In addition to the smell and taste, the following three tests may, according to Deite, be employed for detecting these adulterations:—

1. *The elaidin test.*—Four to 5 c.c. of the oil are placed in a test glass, 1·2 cm. in diameter, along with 2-3 c.c. of nitric acid (sp. gr. 1·185), and well shaken up. A cloudy, whitish or yellowish white oleaginous layer is formed, from which a portion of the nitric acid separates out as a turbid liquid. A couple of copper turnings a

then placed in the glass, and the bottom is warmed until bubbles begin to ascend from the copper; the glass is next set in a place kept at a temperature of 17-20° C., and watched at intervals of five minutes during the first half-hour and every fifteen minutes afterwards. The oily layer must always exhibit a cloudy whiteness, and never be yellow, transparent, or almost clear, nor have a yellow, red, brownish, or brown appearance. After four to five hours the oil layer will be set and white—oil of sweet almonds,—or merely thick and cloudy white as at first—oil of bitter almonds, apricot-kernel oil. From eight to twenty-four hours this layer, regarded by transmitted light, shows up as a solidified stratum of white crystalline granules above the blue acid layer, and is in turn surmounted by a thick somewhat turbid oily layer, with a number of white granules deposited on the walls of the glass. The surface of the liquid layer also frequently contains a deposit of the same granules, and occasionally the whole of the oily stratum is interspersed and thickened with the granules. If the entire oil layer is liquid, and free from the granules in question, or if, instead of being whitish, the layer is almost perfectly clear, or yellow, reddish, or brownish; or, again, if the layer containing the white granules is covered by a liquid, clear or reddish, yellow or brownish, oil layer, then the oil is not pure almond oil. At the end of thirty hours—the limit of the test—the crystalline granules begin to assume a coloured appearance.

2. *The ammonia test.*—This consists in mixing 1 vol. of 10 per cent. ammonia with 3 vols. of the oil. Pure almond oil gives a white to yellowish white mixture, which becomes and remains liquid after half an hour. If brownish or coloured a strong yellow, or if nearly solid at the end of half an hour, the sample is an adulterated oil.

3. *The sulphuric ether test.*—This test is performed by mixing 2 c.c. of the oil with 4 c.c. of ether, and then

pouring down the side of the tube about 1·5 c.c. of concentrated sulphuric acid, so that it collects at the bottom of the mixture. Meanwhile the acid should not be coloured more than yellow. On then shaking gently, so as to mix the upper portion of the acid layer and the lower part of the oil and ether mixture, no dark coloration should ensue, even when the shaking is continued far enough to saturate the acid. The latter may become somewhat darker in shade, but not dark coloured. In the case of old samples of oil, the mixture of oil and acid, without ether, may become dark in colour, but not when ether is present. Most of the adulterating oils give dark-coloured mixtures under the ether test.

### ROSEMARY OIL

Rosemary oil is the volatile oil obtained from the leaves of *Rosmarinus officinalis*; it is colourless, or somewhat yellowish, thin, usually with an acid reaction, with a penetrating odour like camphor, an aromatic, bitter, cooling taste, and of sp. gr. 0·880-0·915. On exposure to the air, it resinifies and thickens, a stearoptone being occasionally deposited. Rosemary oil is soluble in 1-1½ vols. of 90 per cent. alcohol, and gives clear mixtures with ether, carbon disulphide, amyl alcohol, benzol, and benzine. The Italian oil is usually considered the best, the French being next; the German oil is inferior in quality, and generally takes 2 or 3 vols. of 90 per cent. alcohol to dissolve it.

Pure rosemary oil gives a clear mixture with 1-1½ vols. of 90 per cent. alcohol, does not ignite with iodine, and sinks in a mixture of 10 c.c. of 90 per cent. alcohol and 2 c.c. of water. It does not dissolve fuchsine. When heated on a glass slide, it evaporates completely, evolving a pure odour of rosemary.

### OLIVE OIL

Olive oil, the finer grades of which are also known as Provence oil, is pressed out of the fruit of the olive tree.

It commences to become cloudy at 4·5° C., attains the consistence of butter at 2° C., and solidifies at a little below zero C. A distinction is drawn between edible oil and oil for manufacturing purposes. The finest edible oil is the so-called virgin oil, which is obtained by cold-pressing selected fruit. The manufacturing oils are divided into burning oil, second runnings, and sulphur oil, the last-named being recovered from the press residues by extraction with carbon disulphide.

Deite states that olive oil is largely adulterated, especially with cotton-seed oil, which is extremely difficult to detect. The hardening of the oil is utilised as a means of detecting this adulterant, the oil being frozen by means of a refrigerating mixture, and, after remaining two hours in this condition, exposed to the pressure of an iron block, which is loaded with weights until it sinks into the solid oil. From the weight required to produce this result it is possible to tell whether the oil is pure or adulterated with cotton-seed oil, and even whether the latter is present in larger or smaller quantity. Thus, for example, a load of 1700 grams is required to produce penetration in the case of pure olive oil, less than 1000 grams will suffice with the commoner grades; whilst only 25 grams are required for cotton-seed oil, and with mixtures of the two oils the weight lies between these extremes.

Poppy oil is also used to adulterate olive oil, but may be detected by the rise in temperature ensuing when the oil is treated with sulphuric acid. On mixing 10 c.c. of 66° Be. sulphuric acid with 50 grams of pure olive oil, the temperature of the mixture will rise 42° C. in three to five minutes, whereas in the case of poppy oil the accession of temperature amounts to 86·4° C. According to the observations of Fehling, the increase of temperature, under these conditions, in mixtures of olive oil and poppy oil, is in direct and uniform proportion to the amount of poppy oil present. Thus, with

10 per cent. of poppy oil, the mean increase of temperature is 40°·5 C
20 ,, ,, ,, ,, 44° ,,
50 ,, ,, ,, ,, 55° ,,
80 ,, ,, ,, ,, 64° ,,

Additions of earth-nut oil, when in any considerable amount, are easily detected by the bean-like taste peculiar to this oil, and also by the sandy granules which it deposits at a temperature of 8° C., whereas pure olive first begins to deposit solid particles at 4° C.

In order to impart a green colour to olive oil, it is boiled with fresh spinach until all the moisture has been driven off, whereupon 1 per cent. of sodium carbonate is added in order to partly nullify the influence of light on the chlorophyll. Rancid olive oil is rendered edible by treating it with 3 per cent. of finely sifted calcined magnesia, and mixing the whole, for a quarter of an hour, four or five times daily for a whole week. At the end of this time it is filtered, and, if necessary, washed with warm water.

### WAX

Hager has recommended a very useful method for testing the purity of wax.

A small cylindrical piece of wax, 5-6 mm. thick and 3-4 cm. long, is placed in a test-tube, 8-10 cm. long and 1·2-1·4 cm. wide, where it is suffused with sufficient benzine to cover it to a depth of 1-2 cm. If the wax be pure, small dusty particles will separate from the surface of the cylinder, and at the end of one and a half to two hours the whole will be resolved into a powdery mass with level surface. In the case of yellow wax this may take three hours, the wax being at the same time bleached by contact with the benzine, the latter remaining colourless, or assuming a yellowish coloration. Adulterated yellow wax generally retains its colour, besides staining the benzine yellow. In contrast to the pure wax, adulterated cylinders remain unaltered for half a day, sometimes as much as two to four days, and then do not fall down to powder, but split up into longitudinal rods, which are either straight or bent.

If the adulterants do not amount to more than a small percentage, flakes separate from the wax cylinder; at the end of half a day or so the sediment consists of flakes interspersed with broken longitudinal columns. Even when the proportion of adulterant is small, indications pointing to the formation of columnar fragments are present. Hager calls this the benzinate test; it is best applied at a medium temperature—14-18° C. He applied it to all forms of adulteration in wax, and always obtained satisfactory results. Similar behaviour to benzine is exhibited by ethyl ether of sp. gr. 0·720.

### SPERMACETI

Spermaceti is a whitish, rather solid, translucent substance, of nacreous lustre, pulverulent but not brittle, with a slippery but scarcely greasy feel, and exhibiting a foliaceous crystalline fracture, a somewhat insipid taste, and very faint peculiar odour. The sp. gr. is 0·94-0·95; melting point, 45-50° C. It does not leave any greasy mark on paper; is soluble in 7 parts of hot and 35 parts of cold 98 per cent. alcohol; readily soluble in ether, chloroform, or carbon disulphide; and also soluble in benzol, especially when warmed. On prolonged exposure to the air, spermaceti turns yellowish and rancid; on ignition it burns with a brilliant inodorous flame.

Adulterations of spermaceti with stearin are easily revealed by the altered fracture. In such cases, stearic acid can be extracted by boiling with dilute solutions of sodium carbonate, whereas spermaceti melts and floats on the surface of the liquid. On dissolving the sample in 30 parts of benzol, cooling the solution, and leaving it to stand for three days, pure spermaceti will give a perfectly clear liquid; if, however, small crystals are deposited in the course of an hour, the sample is adulterated with paraffin. If the liquid is turbid to milky, the presence of stearic acid is indicated.

## LARD

Hog's lard consists of olein, palmitin, and stearin, and contains 0·23 per cent. of unsaponifiable matter. On exposure to the air, it quickly becomes yellow and rancid, in which condition it readily takes up copper and lead from vessels containing those metals, and therefore becomes poisonous. To test for these metals, the lard is digested with acetic acid, and a portion of the latter is then treated with potassium ferrocyanide, whereupon a brown coloration indicates copper, whilst lead is revealed by a white precipitate produced on treating another part of the acid extract with dilute sulphuric acid. Lard is soluble in 27 parts of absolute alcohol, or 35 parts of alcohol of sp. gr. 0·9128; also in ether, chloroform, carbon disulphide, hot benzine, and warm petroleum ether. When fresh, it has a neutral or faintly acid reaction, and furnishes, on saponification and subsequent decomposition of the soap, 8·80 per cent. of glycerin and 95·90 per cent. of stearic acid, palmitic acid, and oleic acid. It is white in colour, granular, and of the consistence of ointment; the odour is faint and peculiar, and the taste agreeable, rather sweet, and fatty. It flows between the fingers; and when melted and recooled exhibits a crystalline structure.

One of the most frequent methods of adulterating lard is by additions of water in order to increase the weight. This can be easily detected by melting a sample and leaving it to stand in a lukewarm spot, whereupon the water will separate out. The weight is also artificially increased by adding solutions of potash, soda, or caustic soda, which at the same time whiten the colour of the lard; also by adding chalk, alum, clay, common salt, or starch. Two to 5 per cent. of alum, or 1 per cent. of lime, will suffice to mask the presence of 12-15 per cent. of water. Tallow and other fats are also employed to adulterate lard.

To detect the presence of chalk, clay, or alum, a portion of the suspected lard, about 100 grams, is melted with 1-1½ times its own weight of water at 60-70° C., stirred frequently, and set aside for a few hours, whereupon any chalk or clay will settle down. Common salt will be found dissolved in the water, and can be thrown down, as a white precipitate, by an acid solution of silver nitrate. Alum is detected by the copious precipitate furnished with ammonia, or by the white precipitate following the addition of barium sulphide; soda and potash, by the white precipitate with calcium chloride; and potash also, by the yellow coloration given with mercury chloride.

Admixtures of starch or flour give a blue coloration with iodine solution. Tallow is occasionally employed as an adulterant, and is revealed by microscopical examination, since its crystals (deposited from an ethereal solution) are in the shape of plums or curved like the letter S, whereas those of lard are rhomboidal plates, with sloping angular corners. An approximate estimation of the percentage may be arrived at from the number of the crystals of each kind observed.

The detection of extraneous fats as adulterants in lard entails a very thorough examination. The chief adulterant of this class is refined cotton-seed oil, mixed with corresponding amounts of beef tallow or stearin. Of course, it is not impossible that other oils may be used for the same purpose when the price permits. Simple reactions for detecting such additions have been proposed from time to time, and among them an alcoholic solution of silver nitrate. Though pure lard will stand this test, whereas the commercial qualities do not, one is not justified on this ground alone in characterising the latter as adulterated, since the presence of even a very minute amount of extraneous substances will suffice to colour the reagent brown, and such substances are invariably present in commercial brands of lard. The same applies to the molybdic acid test, which is too delicate for the majority of the commercial grades. It is performed as follows:—One gram of the lard is dissolved in about 5 c.c. of chloroform, and treated with 2-3 c.c. of a solution of sodium phosphomolybdate. After shaking and leaving at rest for a few minutes, the two liquids will be found to have separated again, and the reagent solution above the chloroform will have assumed a more or less intense green to greenish blue coloration, according to the amount of reducing substances present in the fat. The same exactly applies to the Hirschsohn reaction for the detection of cotton-seed oil, which, so it is claimed, will reveal as low as 5 per cent. of that oil. Here 5 grams of the sample are treated with 5-6 drops of a solution of 1 gram of gold chloride in 200 grams of chloroform, then well shaken up, and immersed for twenty minutes in boiling water. When cotton-seed oil is present, the mixture assumes a coloration, red or rose by reflected light, and greenish by transmitted light.

Lead acetate has also been recommended as a reagent, and is said to produce a more or less orange-coloured tinge when shaken up with the melted fat, after the latter has previously been agitated with ammonia. All these reactions, however, are uncertain, and the only way to form a decision is by a thorough examination, to determine—

1. The microscopic appearance of the fat recrystallised after melting.
2. The melting point.
3. The saponification value.
4. The melting and solidification points of the fatty acids.
5. The iodine value.

With regard to the examination of lard, Mansfield says that the difficulty in testing the purity of lard resides not merely in the divergent, and for the most part complex, adulterations, but also in the great lack of concordance in the data published in the literature.

The ordinary examination extends, in addition to the tests for gross admixtures—water, mineral matters—to an investigation of the purity of the sample. The principal tests for this purpose are the determination of the iodine value and the refractometer index. In the case of ordinary commercial lard, the former does not exhibit such fluctuations as are given in the literature of the subject.* The fat gives the iodine value 59-63, and the refractometer index 50-51° of the Zeiss butyro-refractometer at 10° C. Divergences from these figures should cause the sample to be suspected. Lower values indicate an admixture of beef tallow, which may be confirmed by the re-crystallisation test, benzol being the best solvent for this purpose.

The best means of detecting vegetable oils are the tests of Becchi and Welmanns, which, however, have to be performed with care, since even pure fats may give slight reactions. It is essential that the fat should be filtered clean. Moreover, since an abnormal iodine value may be given in the case of a complex adulteration, these qualitative reactions should always be performed. In such cases a decision may be obtained by means of a closer examination, which should furnish the following constants:—

Melting point, 38-40° C.
Solidification point, 35-38° C.
Iodine value, 63-64.
Refractometer index at 40° C., 34-36.

Nevertheless, for calculating the percentage of admixture, it is always necessary to isolate the liquid fatty acids. For this purpose the following modification, used in the laboratory of the Paris Bourse, is employed:—

Ten grams of the solid fatty acids are dissolved in 100 c.c. of ether, and shaken up well for some time with 8 grams of zinc oxide. This gives zinc soaps, from which those containing oleic acid can be extracted by ether. The solution is filtered in an aspirator, the ether is expelled by distillation, and the residue decomposed with 20 c.c. of hot dilute hydrochloric acid,—1 : 4,—then washed twice with hot water in a separating funnel, filtered and dried.

Pure lard gives the following values:—

Iodine value of the liquid fatty acids, about 92.

Refractometer index, 44-45.

Both these values are increased to a considerable extent in the case of mixtures containing vegetable oils, since the latter contain linolic acid.

The melting point of the solid fatty acids may be determined by the usual methods. A capillary tube is filled with the melted fat, and, after having cooled down and set, the tube is attached to the tube of a sensitive thermometer. The two are then immersed in a water bath, which is slowly heated until the fat melts, the temperature at which this occurs being read off on the thermometer scale. To increase the accuracy of the determination, the beaker containing the tubes and water may be placed in an outer vessel, and heat applied to the latter.

The saponification value is determined by the Köttstorfer method: 1½-2 grams of the fat are treated with 25 c.c. of half-normal alcoholic caustic potash on the water bath for fifteen minutes; as soon as saponification occurs, 1 c.c. of an alcoholic solution of phenolphthalein is added, and the liquid is titrated with half-normal sodium chloride solution. A blank experiment is made by titrating 25 c.c. of the alcoholic caustic potash by itself. The difference between the number of milligrams of caustic potash used, and the amount found on back titration, is calculated to 1 gram of fat, the result being the saponification value.

For determining the iodine value, Hübl employs an alcoholic mixture of iodine and mercuric chloride: 25 grams of iodine are dissolved in 1½ litres of 95 per cent. alcohol (free from fusel oil), and a similar quantity is used to dissolve 30 grams of mercuric chloride. After standing twelve hours the solution is ready for use, but its standard must be determined before each test. For the iodine value determination, 0·2-0·4 gram of a liquid fat, or 0·8-1·0 gram of solid fat, must be weighed out and dissolved in chloroform. It is then treated in succession with 20 c.c. of the iodine solution, and further additions of 5-10 c.c. each, until the solution has acquired a dark brown colour at the end of two hours, whereupon 10-15 c.c of a 10 per cent. aqueous solution of potassium iodide and 150 c.c. of water are added. The free iodine is then titrated with a solution of sodium thiosulphate containing 24 grams per litre, and the absorbed iodine is referred to percentage units of the fat. The resulting value is known as the iodine value of Hübl value. The figures seem to be constant, or approximately so, for each oil or class of oils, and are highest in the case of the drying vegetable oils. The Hübl method has proved very useful for the detection of cotton-seed oil in tallow and lard, pure cotton-seed oil having the iodine value 109·1, pure tallow 40·8, tallow with 5 per cent. of cotton-seed oil 44, with 10 per cent. 47·1, with 15 per cent. 49·7, with 20 per cent. 52·9, with 25 per cent. 56·1, with 30 per cent. 59·2, with 40 per cent. 66·2. In the case of lard, the detection is hindered by the presence of beef stearin, pure lard having the iodine value 57-63, whilst that of the beef stearin is 23-28.

### PARAFFIN

Paraffin is entirely without taste or smell, bluish white in colour, translucent, with a clear ring and bright vitreous lustre. The melting point varies considerably according to the hardness of the paraffin, the limits being 30-60° C.

The commercial grade known as hard paraffin melts between 55 and 60° C., but softens at a lower temperature, and has a greasy feel even at the ordinary summer temperature. The sp. gr. varies, according to the hardness or melting point, between 0·870 and 0·912. Paraffin is insoluble in water, but is soluble in various proportions of ether, alcohol, chloroform, carbon disulphide, turpentine, and especially in light hydrocarbons, from which it crystallises out in plates. It is not attacked by concentrated acids and alkalis at the ordinary temperature. It boils about 300° C., and decomposes on distillation. It is soluble in nearly all volatile and fatty oils, and is miscible in all proportions with stearic acid, wax, fats, and resins. Solid paraffin melting at 56° C. expands by about one-seventh of its bulk, and exhibits the property, discovered by Albrecht, of expanding to a similar extent when dissolved in oils, and thus converted into the liquid condition, at the ordinary temperature, the solution being lighter than either of its components.

### STYRAX

Styrax belongs to the balsams, and is obtained from a small tree, *Liquidambar orientale*, by subjecting the bark to pressure. It forms a thick turpentine-like mass, grey in colour, of a sharp burning taste, agreeable odour, and soluble in strong alcohol; the solution exhibits a very agreeable aroma when highly diluted, but not before. Styrax possesses the valuable property of fixing a number of very delicate perfumes and reducing their volatility.

A substance not to be confounded with Oriental styrax is that from American sources, put on the market as white Peruvian balsam or liquidambar, and derived from *Liquidambar styraciflua*. This is quite transparent, pale yellow in colour, and more fluid than the Asiatic styrax, which it is sometimes used to replace, though of a less delicate odour.

### PERUVIAN BALSAM

Peruvian balsam is brought to market from Central and South America. It is derived from *Myroxolon peruiferum*, and is obtained by making incisions in the bark and stem, from which the balsam then exudes. It is of syrupy consistence, viscous, and the colour is brownish red when viewed in thin layers, or blackish brown in thick layers. The taste is bitter and burning, afterwards irritating; the odour is similar to vanilla, but less delicate. Peruvian balsam is completely soluble in alcohol, chloroform, and amyl alcohol; partly so in ether, benzol, petroleum, ether, turpentine, fatty oils, and caustic alkalis.

Peruvian balsam is frequently adulterated with alcohol, copaiba balsam, castor oil, and styrax. The detection of the adulterants is attended with difficulty; but, on the other hand, the characteristics of Peruvian balsam are so decided that one can easily determine whether a sample is adulterated or not. The chief criteria are the density and solubility. The former—1·14-1·16—is usually checked by means of a solution of common salt, containing 1 part of dry sodium chloride to 5 parts of water, and having the sp. gr. 1·125. If a drop of Peruvian balsam, introduced into this solution, sinks, the sample may be considered pure; in the contrary event, it is certainly adulterated, all the adulterants of Peruvian balsam having a relatively lower density, namely, alcohol, copaiba balsam (0·95), castor oil (0·96), turpentine (0·87).

### NUTMEGS

Nutmegs are nuts, almost globular in shape, about as large as a walnut, greyish brown in colour externally, and covered with a reticulated whitish grey coating, the inside being reddish brown with white marbled patches.

Good fresh nutmegs should be close, heavy, and at the same time so rich in oil that the latter exudes on the nutmeg being pierced with a needle. Light nutmegs, which are hollow and worm-eaten, besides being poor in aroma, are unsuitable.

### BENZOIN

Benzoin, a soft resin, is derived from a tree of the Styracineae family, indigenous to tropical Asia. As a rule, fine benzoin forms nodules of extremely divergent size, light grey in colour, and interspersed by white almond-like lumps—almond benzoin. This kind of benzoin, which, from its origin, is also known as Siam benzoin, is mostly in small lumps—tears—which are translucent, pale yellow to brown externally, but milkwhite in fracture, and exhibiting a very powerful odour of vanilla. Less fine, but still highly appreciated, is the variety known as Siam benzoin, in masses consisting of large red-brown lumps, enclosing white portions—almonds. Inferior in quality, but highly prized, is the true Sumatra almond benzoin, which comes to market in the form of lumps as large as the fist. Calcutta benzoin is in the form of large friable blocks of a dirty reddish brown colour. Penang or Sumatra benzoin invariably contains cinnamic acid as well as benzoic acid; this kind usually comes on the market as chocolate-brown masses, containing numerous rather large crystals; it is packed in drums. The inferior grades of benzoin consist of brownish fragments without any white patches, but frequently contaminated to a large extent with splinters of wood, bast fibres, remains of leaves, etc., and suitable only for cheap preparations.

In addition to the foregoing properties, fine benzoin must also exhibit a sweetish, sharp burning taste, be readily pulverulent, and, when heated in a porcelain basin, liberate, in addition to the irritating vapours of benzoic acid, a very agreeable perfume. It should also be almost completely soluble in strong alcohol.

Benzoin melts at 65-80° C., is readily soluble in alcohol and ether, and partly so in chloroform, amyl alcohol, benzol, petroleum ether, sodium carbonate solution, and caustic alkalies. It is insoluble in fatty oils, but soluble in cold acetic acid.

### PETROLEUM JELLY

Petroleum jelly is the final product of the distillation of petroleum residue. It is yellowish, yellow, or pure white in colour, of the consistence of ointment or lard, is devoid of taste or smell, translucent in thin layers, and possesses the property of not becoming rancid. Thanks to this property, petroleum jelly enjoys a fairly extensive employment in connection with the care of the skin; although, on the other hand, its incapacity of absorption by the skin—in which respect it differs from the animal and vegetable fats—would not seem to render it specially suitable for that purpose.

The consistence of various kinds of petroleum jelly is not always the same, but ranges from that of goose fat to the firmness of butter; accordingly, the melting point also varies, ranging between 30° and 45° C. Petroleum jelly is frequently mixed with spermaceti, paraffin, or ceresin, in order to make it firmer; and artificial petroleum jellies are also known.

Petroleum jelly is insoluble in water and glycerin, but miscible with the latter when the same is free from water; it is only very slightly soluble in 90 per cent. alcohol, but is soluble in 150 parts of absolute alcohol. It is more or less soluble in ether and chloroform, according to circumstances, more readily so in benzol, and most easily of all in carbon disulphide. With ethereal and fatty oils it is miscible in all proportions. It dissolves bromine and iodine at the ordinary temperature, but sulphur not below 120-130° C. Furthermore, it exhibits the peculiar property that when heated for about fifteen hours to 110° C. it will absorb oxygen, whereby it acquires an acid reaction and smell.

In order to test petroleum jelly for the frequently observed addition of vegetable and animal fats, La Reole and Dupin propose to rub down a given quantity—5 grams—of petroleum jelly with 5 drops of a solution of potassium permanganate, in a mortar. In the case of pure petroleum jelly, the rose-red coloration of the reagent will be retained, but will be instantly converted into a chestnut brown when extraneous fats are present; and the amount of fat thus added as an adulterant can be determined from the depth of the colour.

Michle has proposed the following test for the purity of petroleum jelly:—Two grams of petroleum jelly are dissolved in 5 grams of chloroform, and shaken up energetically with 10 c.c. of water, a single drop of phenolphthalein solution being then added. In the case of pure petroleum jelly no colour change is produced, but a rose-red is formed on adding a single drop of decinormal caustic potash, thus indicating freedom from acid and alkali. Another test by the same author is to heat 10 grams of petroleum jelly along with 10 grams of water on the water bath for a quarter of an hour, with stirring. After cooling, the water is poured off, and should be perfectly neutral, giving no sulphuric acid reaction with barium chloride, and leaving merely an imponderable residue when evaporated to dryness on a watch-glass.

Petroleum jelly is browned when heated on the water bath with 98 per cent. sulphuric acid, though weaker—73 per cent.—acid has no action, except when an imperfectly refined sample—technical petroleum jelly—is present. The best method of performing this test is to melt 10 grams of the petroleum jelly in the water bath, and add 50 drops of 73 per cent. sulphuric acid, the whole being then heated, with stirring, for another quarter of an hour. If the petroleum jelly be pure, the acid will exhibit scarcely any alteration, no dark ring being formed at the plane of contact, nor is the acid coloured brown. Again, if 5 grams of petroleum jelly be heated with 5 grams of sodium carbonate and 25 c.c. of water, for half an hour on the water bath and stirred, the aqueous layer being poured off when cold, and then treated with sufficient hydrochloric acid to produce supersaturation, the liquid will remain clear, provided neither resins nor fatty acids are present.

Vaselone, a substitute for petroleum jelly, is a solution of stearone and margarone in a neutral mineral oil. The stearone is obtained by distilling 75 parts of stearic acid with 25 parts of dry powdered lime, in an iron cylinder or retort, at a temperature of 400° C. The product melts at 86° C. The margarone is prepared in the same manner, by distilling beef fat with lime. The vaselone is prepared by dissolving 15 parts of margarone and 5 parts of stearone in 100 parts of pure, inodorous mineral oil. The finished product resembles petroleum jelly, except that it is not transparent. It is white, inodorous, neutral, and is not attacked by acids or other chemical reagents.

### LANOLIN

Lanolin is purified wool fat. It melts at 40° C., and can absorb up to 105 per cent. of water without losing its salve-like consistence. It is employed as a basis for ointments, an adjunct to cosmetic soaps, etc., etc., being difficult to saponify, and therefore not liable to become rancid. A. von Rod removes the colouring matter and smell of crude wool fat by treating it with oxidising agents, such as bleaching powder, or permanganate, in alkaline solution. The wool fat is extracted by strong alcohol, benzine, sulphuric ether, benzol, ether, and chloroform.

The following method for testing lanolin has been recommended by Astolfi, on the basis of comparatively colometric determinations, and can also be extended to form a quantitative examination. He treats 0·1 gram of lanolin with 10 c.c. of concentrated sulphuric acid, the result being an intense red liquid with greenish fluorescence. The colour decreases in intensity in proportion as the wool fat is adulterated with substances other than cholesterin. This solution is then treated with 10 c.c. of chloroform, and shaken up energetically. On the separation of the liquid into two layers, the chloroform will be found coloured a brilliant red if the wool fat be pure, but will be less red if the sample contain adulterations of water, extraneous fats, and the like. Furthermore, when the lanolin is pure, a black ring will be discernible at the plane of contact, but is less decided when the sample is adulterated. By comparing these results with those furnished by a sample of known purity under the same treatment, the extent of the adulteration, if any, can be estimated.